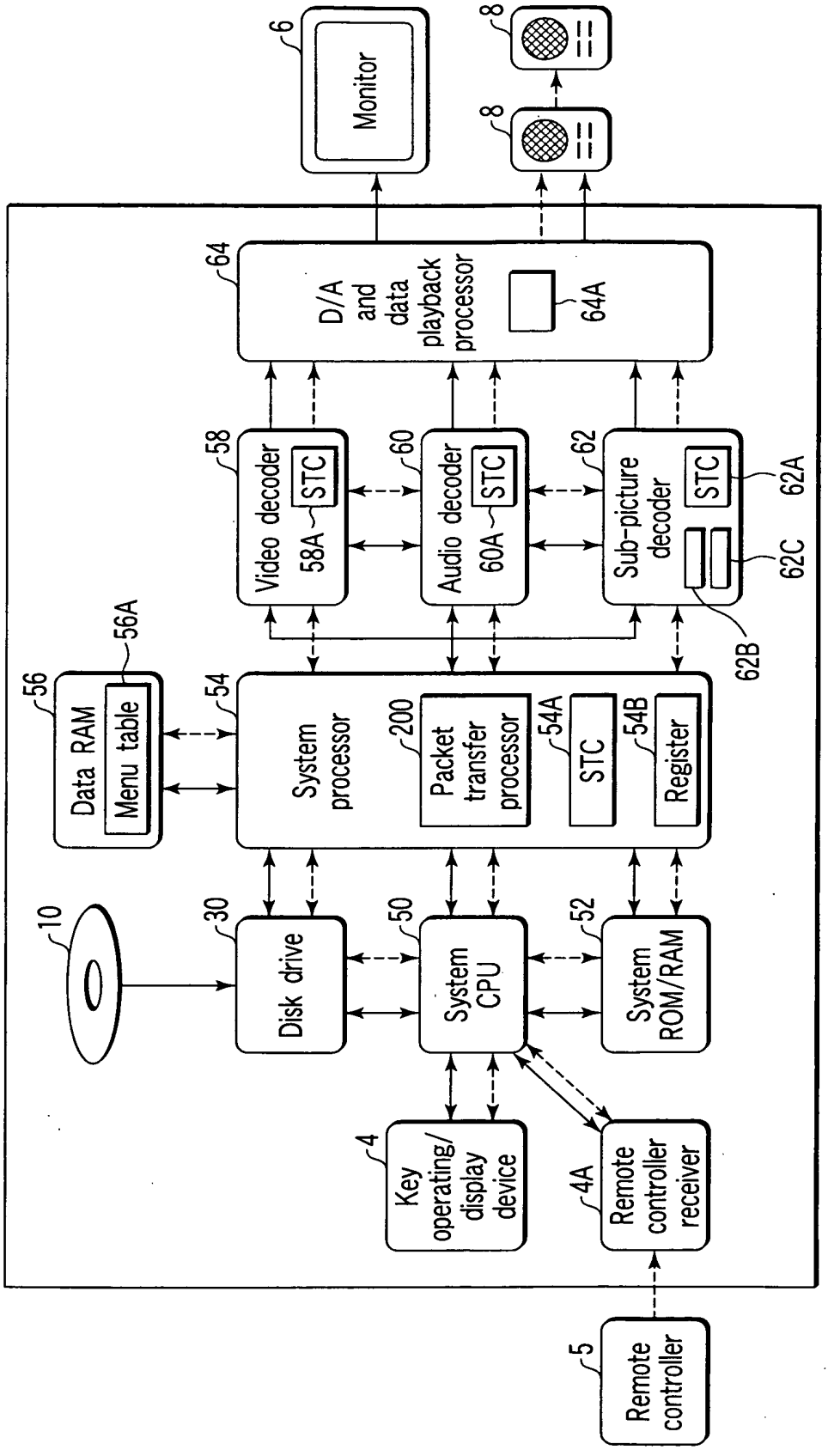

Monitor
6
8
8
D/A and data playback processor
64
64A
Video decoder
58
STC
58A
Audio decoder
60
STC
60A
Sub-picture decoder
62
STC
62A
62C
62B
Data RAM
56
Menu table
56A
System processor
54
Packet transfer processor
200
STC
54A
Register
54B
10
Disk drive
30
System CPU
50
System ROM/RAM
52
Key operating/ display device
4
Remote controller receiver
4A
Remote controller
5

FIG. 1

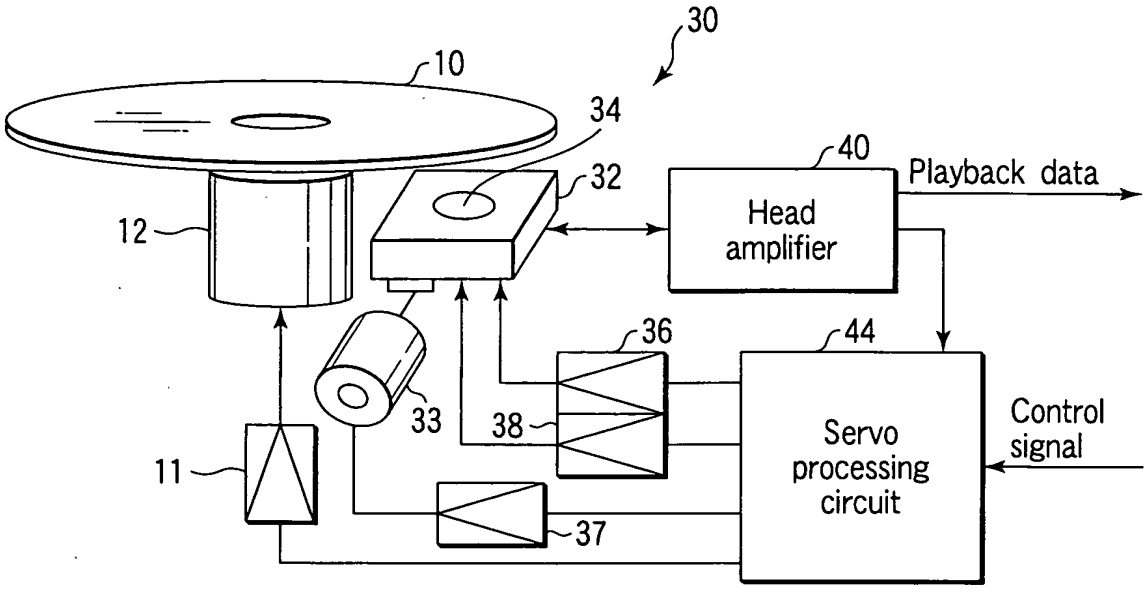

30
10
34
32
40
Playback data
Head amplifier
12
36
44
33
38
Servo processing circuit
Control signal
11
37

FIG. 2

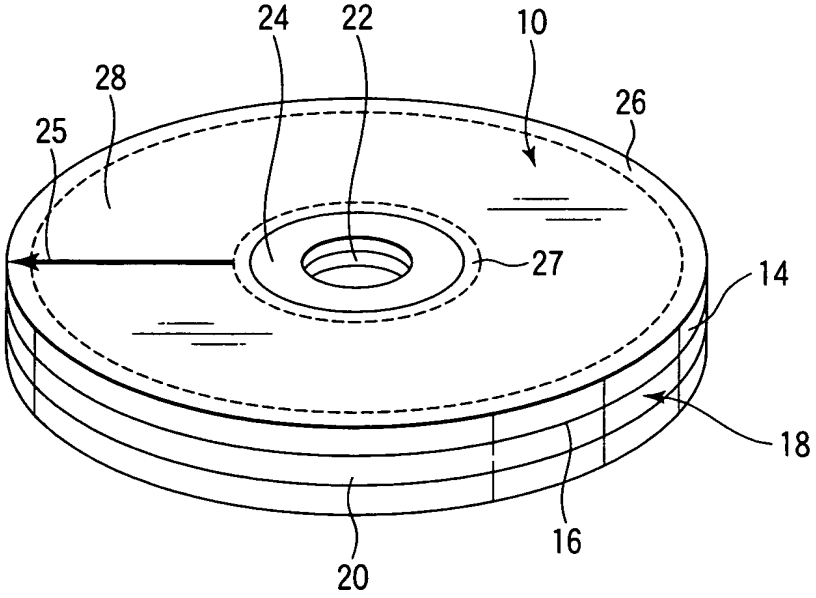

24
22
10
28
26
25
27
14
18
16
20

FIG. 3

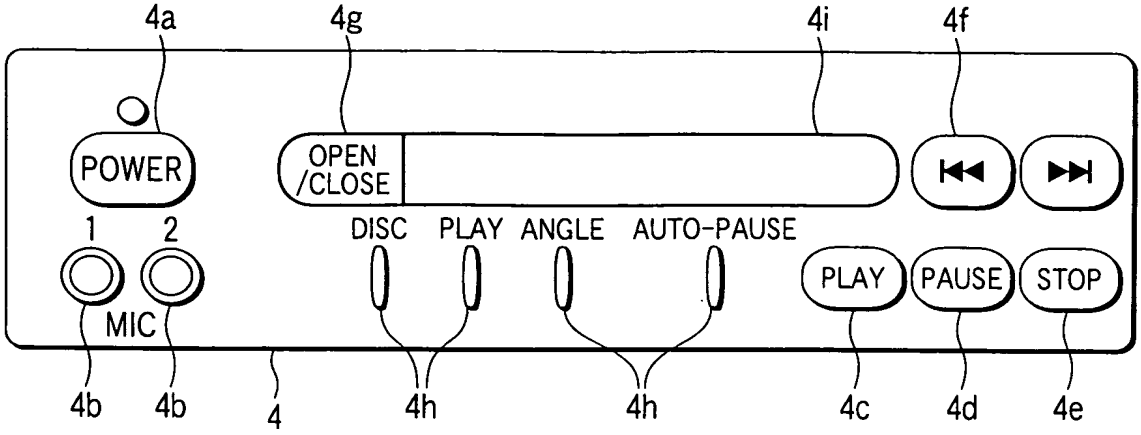

4a
4g
4i
4f
POWER
OPEN
/CLOSE
1
2
MIC
DISC
PLAY
ANGLE
AUTO-PAUSE
PLAY
PAUSE
STOP
4b
4b
4
4h
4h
4c
4d
4e

FIG. 4

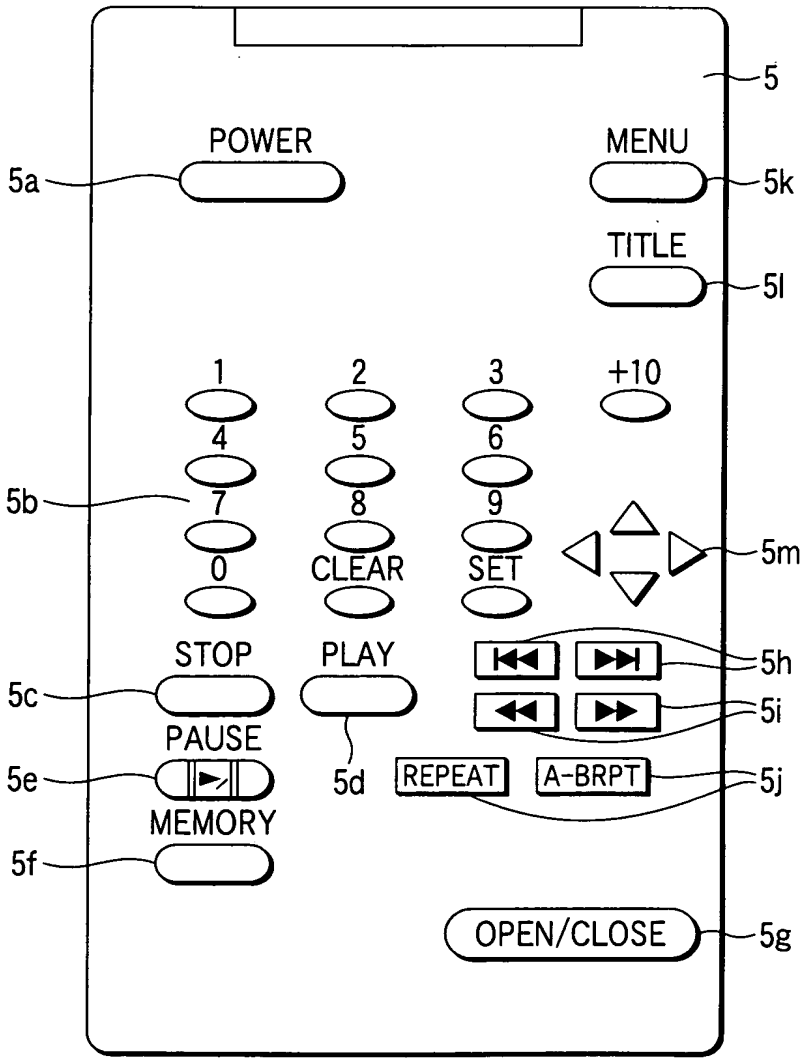

5
POWER
5a
MENU
5k
TITLE
5l
1
2
3
+10
4
5
6
5b
7
8
9
0
CLEAR
SET
5m
STOP
PLAY
5h
5c
5i
PAUSE
5e
5d
REPEAT
A-BRPT
5j
MEMORY
5f
OPEN/CLOSE
5g

FIG. 5

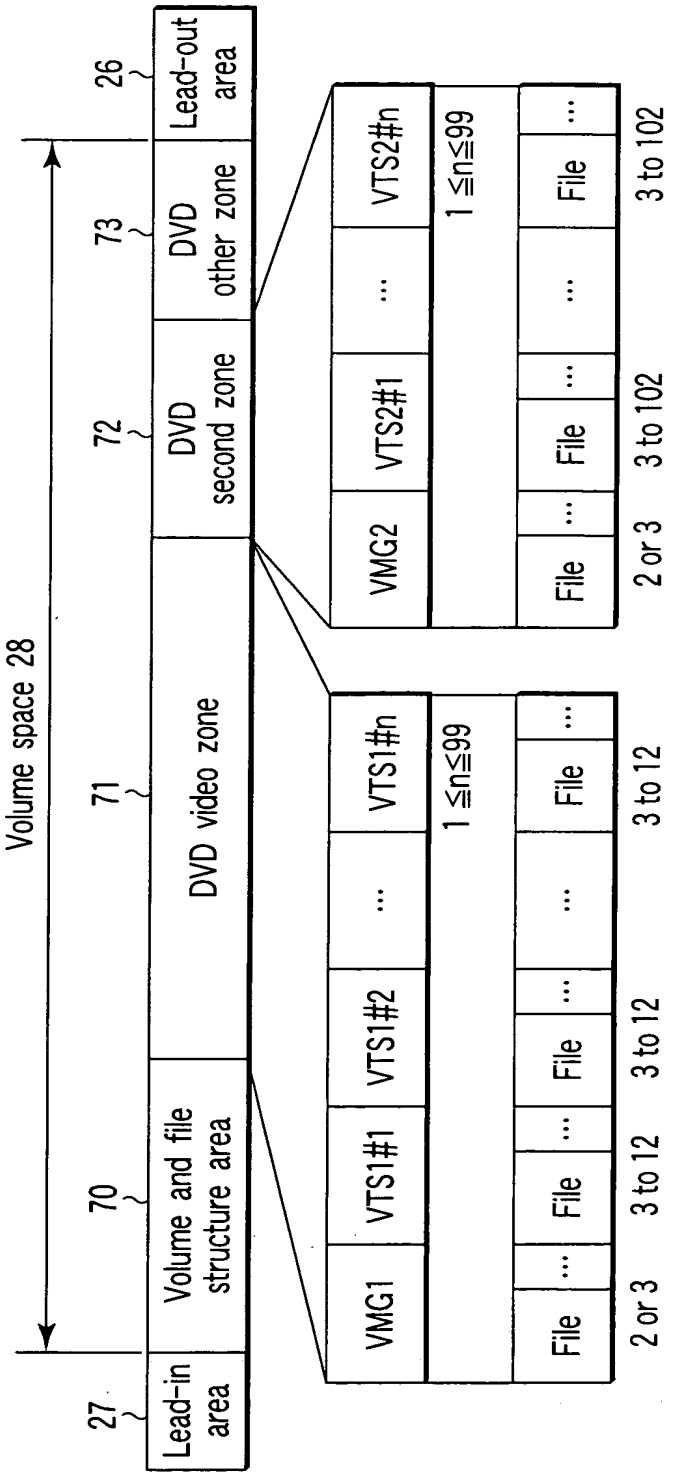

Volume space 28
27
Lead-in area
70
Volume and file structure area
71
DVD video zone
72
DVD second zone
73
DVD other zone
26
Lead-out area
VMG1
VTS1#1
VTS1#2
...
VTS1#n
1 ≦n≦99
File
...
2 or 3
3 to 12
VMG2
VTS2#1
VTS2#n
1 ≦n≦99
File
...
2 or 3
3 to 102

FIG. 6

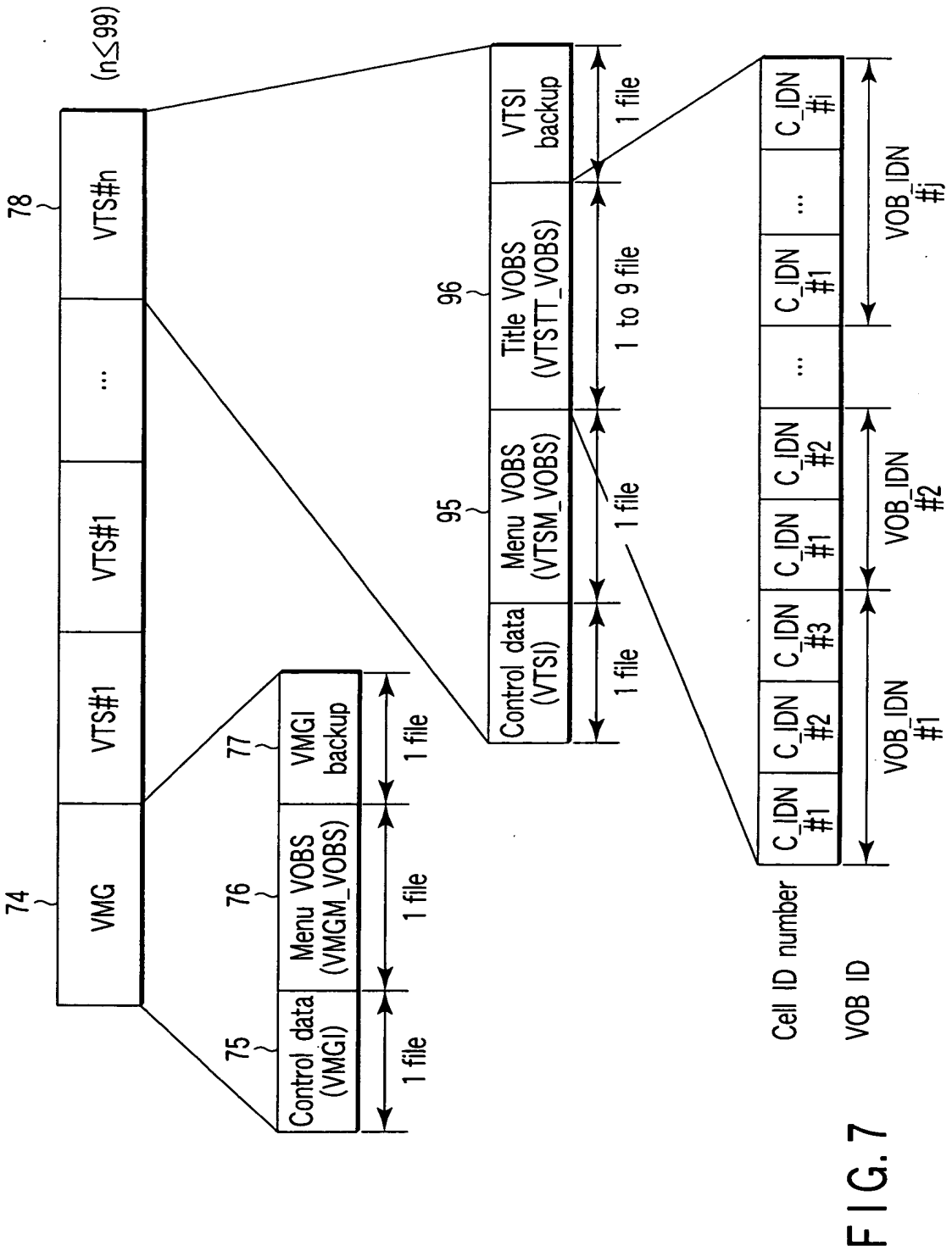

74
VMG
VTS#1
VTS#1
...
VTS#n
78
(n≤99)
75
Control data (VMGI)
1 file
76
Menu VOBS (VMGM_VOBS)
1 file
77
VMGI backup
1 file
95
Control data (VTSI)
1 file
Menu VOBS (VTSM_VOBS)
1 file
96
Title VOBS (VTSTT_VOBS)
1 to 9 file
VTSI backup
1 file
Cell ID number
VOB ID
C_IDN #1
C_IDN #2
C_IDN #3
VOB_IDN #1
C_IDN #1
C_IDN #2
VOB_IDN #2
...
C_IDN #1
C_IDN #i
VOB_IDN #j

FIG. 7

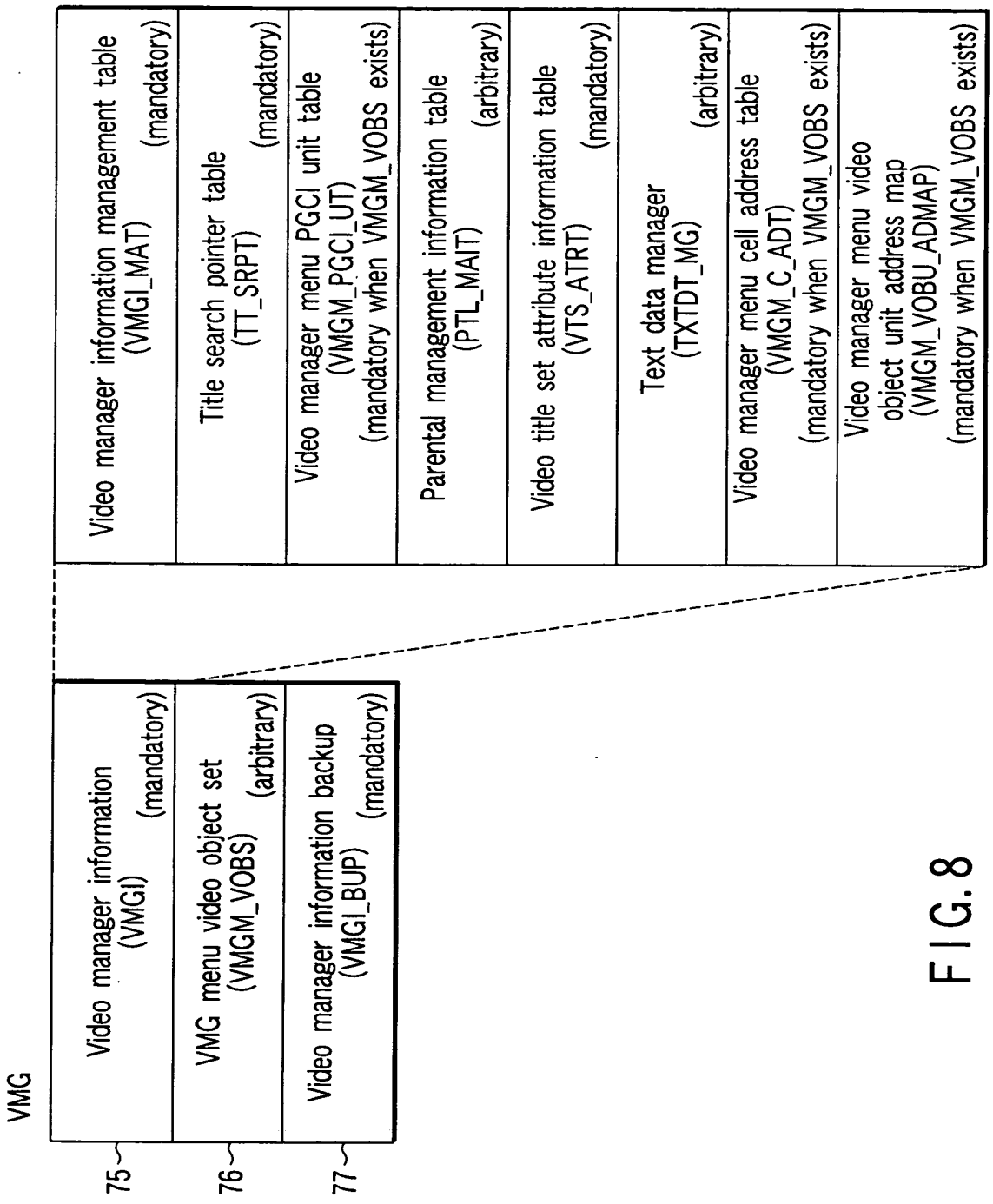

VMG
Video manager information (VMGI) (mandatory)
VMG menu video object set (VMGM_VOBS) (arbitrary)
Video manager information backup (VMGI_BUP) (mandatory)
75
76
77
Video manager information management table (VMGI_MAT) (mandatory)
Title search pointer table (TT_SRPT) (mandatory)
Video manager menu PGCI unit table (VMGM_PGCI_UT) (mandatory when VMGM_VOBS exists)
Parental management information table (PTL_MAIT) (arbitrary)
Video title set attribute information table (VTS_ATRT) (mandatory)
Text data manager (TXTDT_MG) (arbitrary)
Video manager menu cell address table (VMGM_C_ADT) (mandatory when VMGM_VOBS exists)
Video manager menu video object unit address map (VMGM_VOBU_ADMAP) (mandatory when VMGM_VOBS exists)

FIG. 8

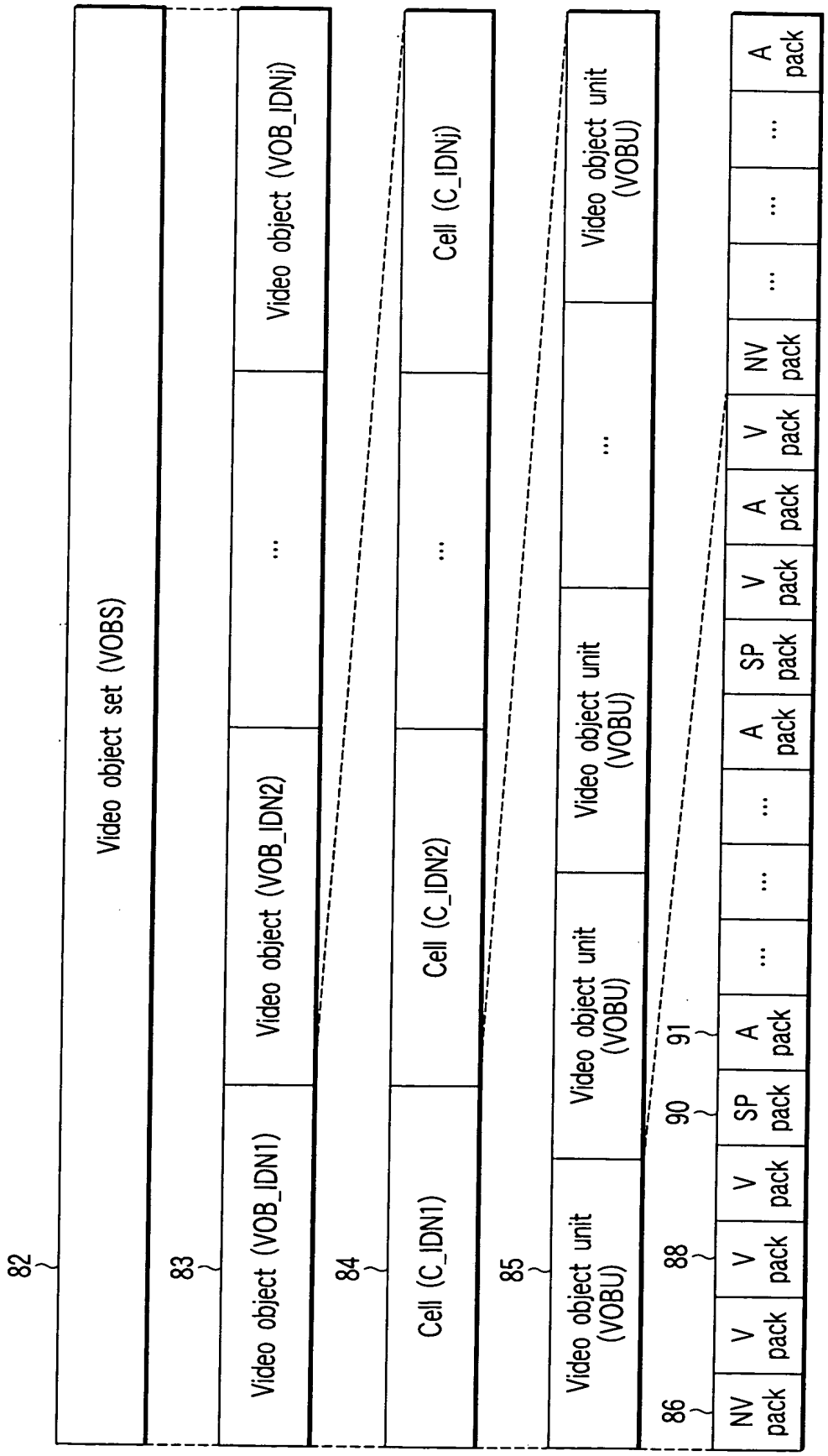

82
Video object set (VOBS)
83
Video object (VOB_IDN1)
Video object (VOB_IDN2)
...
Video object (VOB_IDNj)
84
Cell (C_IDN1)
Cell (C_IDN2)
...
Cell (C_IDNj)
85
Video object unit (VOBU)
Video object unit (VOBU)
...
Video object unit (VOBU)
86
88
90
91
NV pack
V pack
V pack
V pack
SP pack
A pack
...
...
A pack
SP pack
V pack
A pack
V pack
NV pack
...
...
...
A pack

FIG. 9

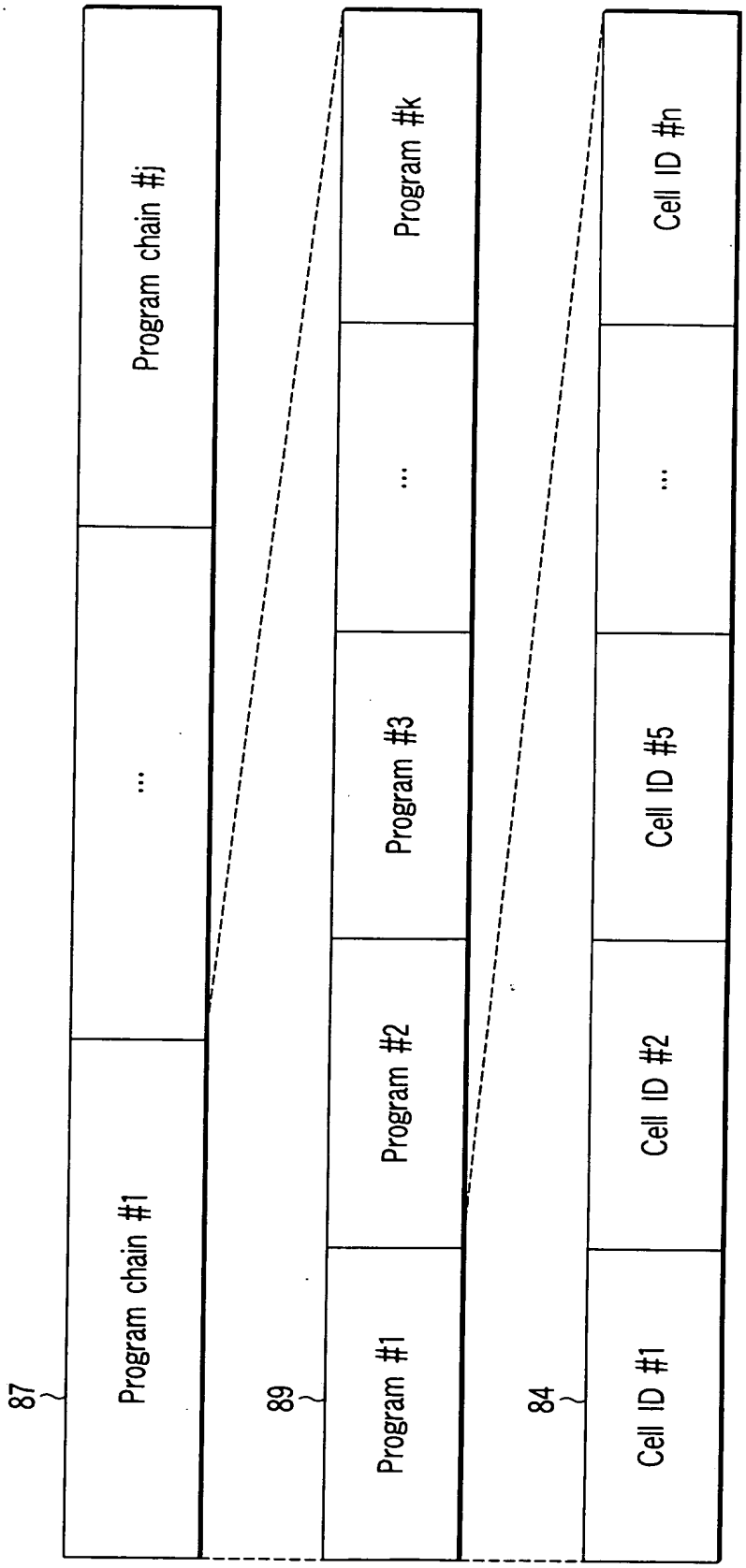

Program chain #j
...
Program chain #1
87
Program #k
...
Program #3
Program #2
Program #1
89
Cell ID #n
...
Cell ID #5
Cell ID #2
Cell ID #1
84

FIG. 10

VMGI_MAT (Description order)

RBP		Contents	Number of bytes
0 to 11	VMG_ID	VMG Identifier	12 bytes
12 to 15	VMG_EA	End address of VMG	4 bytes
16 to 27	reserved	reserved	12 bytes
28 to 31	VMGI_EA	End address of VMGI	4 bytes
32 to 33	VERN	Version number of DVD Video Specifications	2 bytes
34 to 37	VMG_CAT	Video Manager Category	4 bytes
38 to 45	VLMS_ID	Volume Set Identifier	8 bytes
46 to 61	reserved	reserved	16 bytes
62 to 63	VTS_Ns	Number of Video Title Sets	2 bytes
64 to 95	PVR_ID	Provider unique ID	32 bytes
96 to 103	POS_CD	POS Code	8 bytes
104 to 127	reserved	reserved	24 bytes
128 to 131	VMGI_MAT_EA	End address of VMGI_MAT	4 bytes
132 to 135	FP_PGCI_SA	Start address of FP_PGCI	4 bytes
136 to 191	reserved	reserved	56 bytes
192 to 195	VMGM_VOBS_SA	Start address of VMGM_VOBS	4 bytes
196 to 199	TT_SRPT_SA	Start address of TT_SRPT	4 bytes
200 to 203	VMGM_PGCI_UT_SA	Start address of VMGM_PGCI_UT	4 bytes
204 to 207	PTL_MAIT_SA	Start address of PTL_MAIT	4 bytes
208 to 211	VTS_ATRT_SA	Start address of VTS_ATRT	4 bytes
212 to 215	TXTDT_MG_SA	Start address of TXTDT_MG	4 bytes
216 to 219	VMGM_C_ADT_SA	Start address of VMGM_C_ADT	4 bytes
220 to 223	VMGM_VOBU_ADMAP_SA	Start address of VMGM_VOBU_ADMAP	4 bytes
224 to 255	reserved	reserved	32 bytes
256 to 257	VMGM_V_ATR	Video attribute of VMGM	2 bytes
258 to 259	VMGM_AST_Ns	Number of Audio streams of VMGM	2 bytes
260 to 267	VMGM_AST_ATR	Audio stream attribute of VMGM	8 bytes
268 to 323	reserved	reserved	56 bytes
324 to 339	reserved	reserved	16 bytes
340 to 341	VMGM_SPST_Ns	Number of Sub-picture streams of VMGM	2 bytes
342 to 347	VMGM_SPST_ATR	Sub-picture stream attribute of VMGM	6 bytes
348 to 1023	reserved	reserved	676 bytes
1024 to 2291 (max.)	FP_PGCI	First Play PGCI	0 or (236 to 1268) bytes

FIG. 11

VERN

b15	b14	b13	b12	b11	b10	b9	b8
reserved							

b7	b6	b5	b4	b3	b2	b1	b0
Book Part version							

FIG. 12

VMG_CAT

b31	b30	b29	b28	b27	b26	b25	b24
reserved							

b23	b22	b21	b20	b19	b18	b17	b16
RMA#8	RMA#7	RMA#6	RMA#5	RMA#4	RMA#3	RMA#2	RMA#1

b15	b14	b13	b12	b11	b10	b9	b8
reserved		reserved					

b7	b6	b5	b4	b3	b2	b1	b0
reserved							

FIG. 13

VMGM_V_ATR

b15	b14	b13	b12	b11	b10	b9	b8
Video compression mode		TV system		Aspect ratio		Display mode	

b7	b6	b5	b4	b3	b2	b1	b0
line21_switch_1	line21_switch_2	Source picture resolution				reserved	

Source picture letterboxed

FIG. 14

VMGM_SPST_Ns

b15	b14	b13	b12	b11	b10	b9	b8
reserved							

b7	b6	b5	b4	b3	b2	b1	b0
reserved		Number of sub-picture streams					

FIG. 15

VMGM_SPST_ATR

b47	b46	b45	b44	b43	b42	b41	b40
Sub-picture coding mode			reserved			reserved	

b39	b38	b37	b36	b35	b34	b33	b32
reserved							

b31	b30	b29	b28	b27	b26	b25	b24
reserved							

b23	b22	b21	b20	b19	b18	b17	b16
reserved							

b15	b14	b13	b12	b11	b10	b9	b8
reserved							

b7	b6	b5	b4	b3	b2	b1	b0
reserved							

FIG. 16

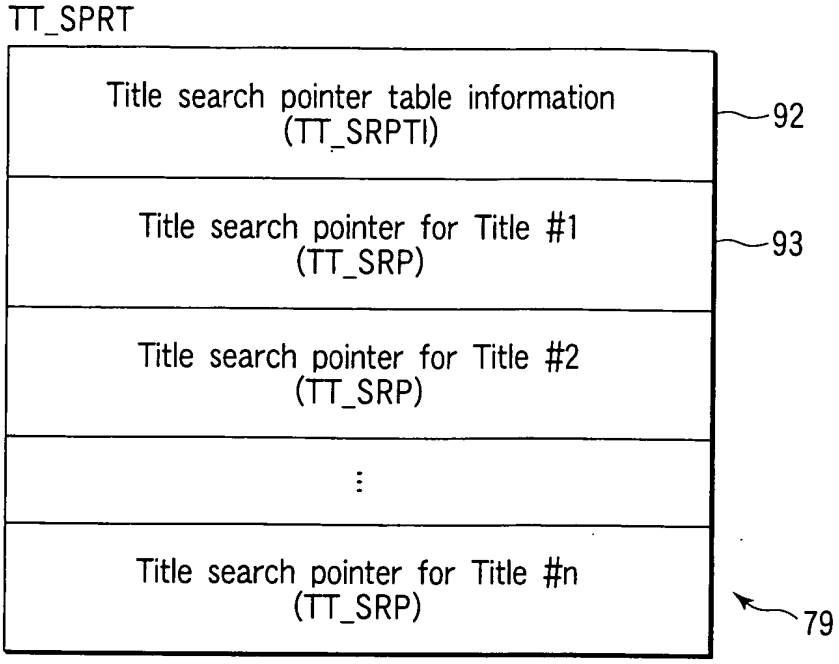


FIG. 17

TT_SRPTI	(Description order)
	Contents
TT_Ns	Number of title search pointers
TT_SRPT_EA	End address of TT_SRPT

FIG. 18

TT_SRP	(Description order)
	Contents
PTT_Ns	Number of part-of-titles
VTSN	Video title set number
VTS_TTN	Video title set title number
VTS_SA	Start address of video title set

FIG. 19

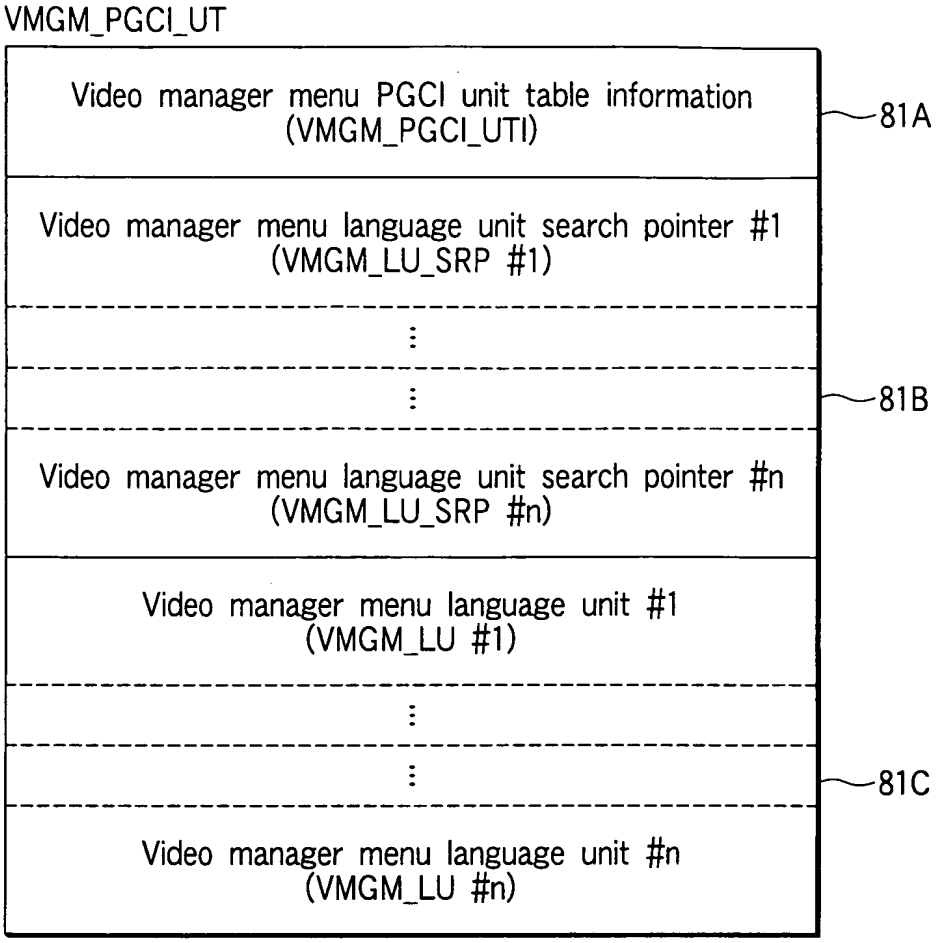


FIG. 20

VMGM_PGCI_UTI

	Contents
VMGM_LU_Ns	Number of video manager menu language units
VMGM_PGCI_UT_EA	End address of video manager menu language unit

FIG. 21

VMSM_LU_SRP

	Contents
VMGM_LCD	Video manager menu language code
VMGM_LU_SA	Start address of video manager menu language unit

FIG. 22

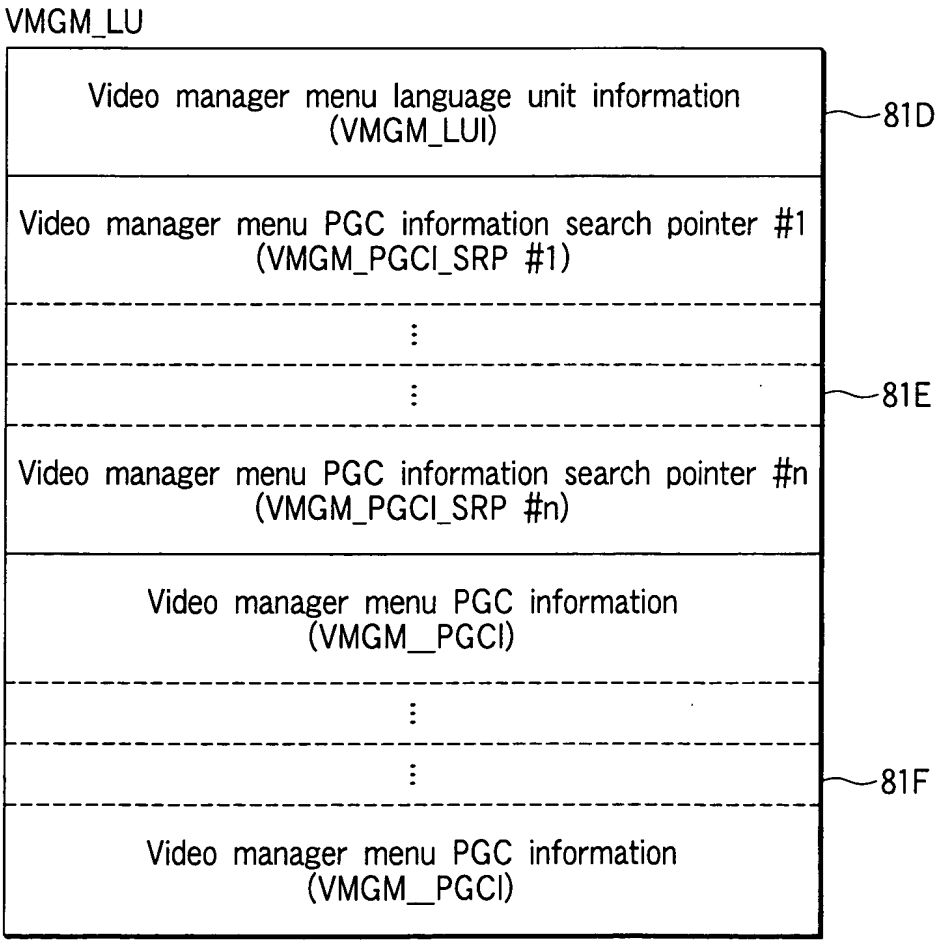


FIG. 23

VMGM_LUI (Description order)

	Contents	Number of bytes
(1) VMGM_PGCI_SRP_Ns	Number of VMGM_PGCI_SRPSs	2 bytes
reserved	reserved	2 bytes
(2) VMGM_LU_EA	End address of VMGM_LU	4 bytes

FIG. 24

VMGM_PGCI_SRP (Description order)

	Contents	Number of bytes
(1) VMGM_PGC_CATs	VMGM_PGC category	4 bytes
(2) VMGM_PGCI_SA	Start address of VMGM_PGCI	4 bytes

FIG. 25

VMGM_PGC_CAT

b31	b30	b29	b28	b27	b26	b25	b24
Entry type	reserved			Menu ID			
b23	b22	b21	b20	b19	b18	b17	b16
Block mode		Block type		reserved			VOB_ VERN
b15	b14	b13	b12	b11	b10	b9	b8
PTL_ID_FLD (Upper bits)							
b7	b6	b5	b4	b3	b2	b1	b0
PTL_ID_FLD (Lower bits)							

FIG. 26

VMGM_C_ADTI (Description order)

	Contents	Number of bytes
(1) VMGM_VOB_Ns	Number of VOBs in VMGM_VOBS	2 bytes
reserved	reserved	2 bytes
(2) VMGM_LU_EA	End address of VMGM_LU	4 bytes

FIG. 27

VMGM_CPI (Description order)

	Contents	Number of bytes
(1) VMGM_VOB_IDN	VOB ID number in VMGM_VOBS	2 bytes
(2) VMGM_C_IDN	Cell_ID number of VMGM_CP	1 bytes
(3) VMGM_VOB_CAT	VMGM_VOB category	1 bytes
(4) VMGM_CP_SA	Start address of VMGM_CP	4 bytes
(5) VMGM_CP_EA	End address of VMGM_CP	4 bytes

FIG. 28

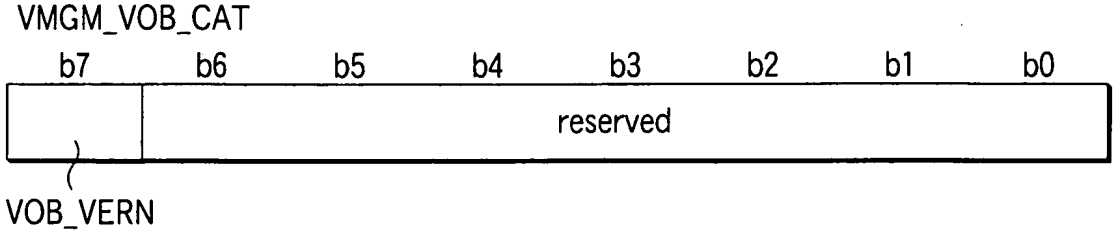


FIG. 29

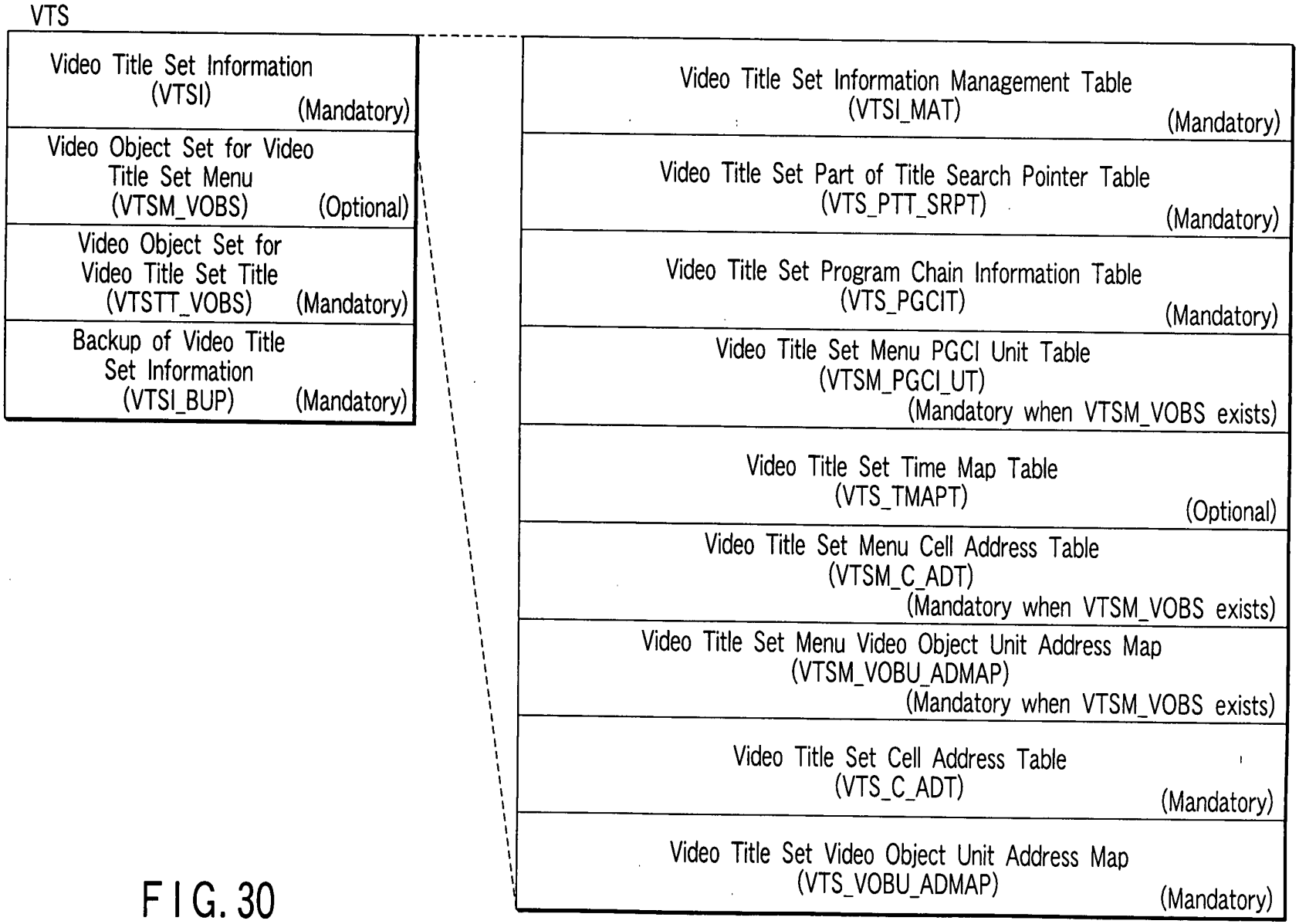


FIG. 30

VTSI_MAT (Description order)

RBP		Contents	Number of bytes
0 to 11	VTS_ID	VTS Identifier	12 bytes
12 to 15	VTS_EA	End address of VTS	4 bytes
16 to 27	reserved	reserved	12 bytes
28 to 31	VTSI_EA	End address of VTSI	4 bytes
32 to 33	VERN	Version number of DVD Video Specification	2 bytes
34 to 37	VTS_CAT	VTS Category	4 bytes
38 to 127	reserved	reserved	90 bytes
128 to 131	VTSI_MAT_EA	End address of VTSI_MAT	4 bytes
132 to 191	reserved	reserved	60 bytes
192 to 195	VTSM_VOBS_SA	Start address of VTSM_VOBS	4 bytes
196 to 199	VTSTT_VOBS_SA	Start address of VTSTT_VOBS	4 bytes
200 to 203	VTS_PTT_SRPT_SA	Start address of VTS_PTT_SRPT	4 bytes
204 to 207	VTS_PGCIT_SA	Start address of VTS_PGCIT	4 bytes
208 to 211	VTSM_PGCI_UT_SA	Start address of VTSM_PGCI_UT	4 bytes
212 to 215	VTS_TMAPT_SA	Start address of VTS_TMAPT	4 bytes
216 to 219	VTSM_C_ADT_SA	Start address of VTSM_C_ADT	4 bytes
220 to 223	VTSM_VOBU_ADMAP_SA	Start address of VTSM_VOBU_ADMAP	4 bytes
224 to 227	VTS_C_ADT_SA	Start address of VTS_C_ADT	4 bytes
228 to 231	VTS_VOBU_ADMAP_SA	Start address of VTS_VOBU_ADMAP	4 bytes
232 to 255	reserved	reserved	24 bytes
256 to 257	VTSM_V_ATR	Video attribute of VTSM	2 bytes
258 to 259	VTSM_AST_Ns	Number of Audio streams of VTSM	2 bytes
260 to 267	VTSM_AST_ATR	Audio stream attribute of VTSM	8 bytes
268 to 323	reserved	reserved	56 bytes
324 to 339	reserved	reserved	16 bytes
340 to 341	VTSM_SPST_Ns	Number of Sub-picture streams of VTSM	2 bytes
342 to 347	VTSM_SPST_ATR	Sub-picture stream attribute of VTSM	6 bytes
348 to 511	reserved	reserved	164 bytes
512 to 513	VTS_V_ATR	Video attribute of VTS	2 bytes
514 to 515	VTS_AST_Ns	Number of Audio streams of VTS	2 bytes
516 to 579	VTS_AST_ATRT	Audio stream attribute table of VTS	64 bytes
580 to 595	reserved	reserved	16 bytes
596 to 597	VTS_SPST_Ns	Number of Sub-picture streams of VTS	2 bytes
598 to 789	VTS_SPST_ATRT	Sub-picture stream attribute table of VTS	192 bytes
790 to 791	reserved	reserved	2 bytes
792 to 983	VTS_MU_AST_ATRT	Multichannel Audio stream attribute table of VTS	192 bytes
984 to 1023	reserved	reserved	40 bytes
1024 to 2047	reserved	reserved	1024 bytes

FIG. 31

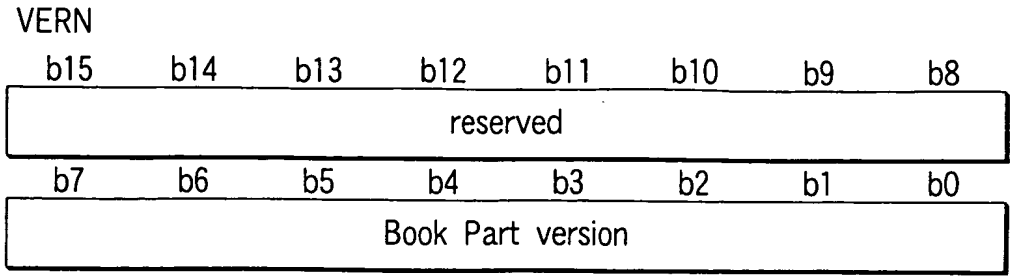


FIG. 32

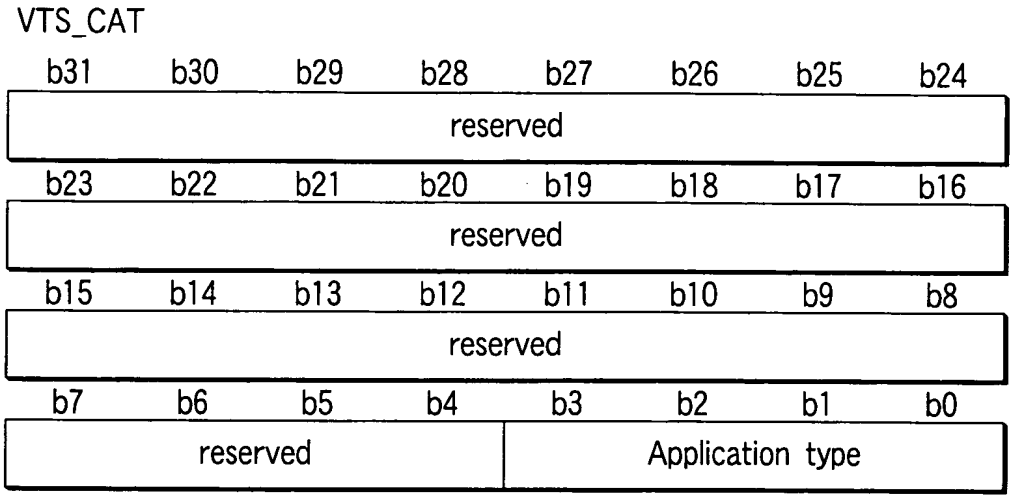


FIG. 33

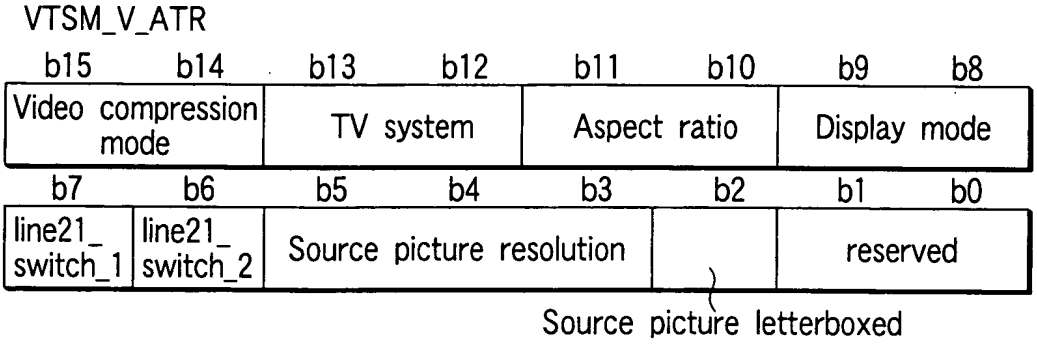


FIG. 34

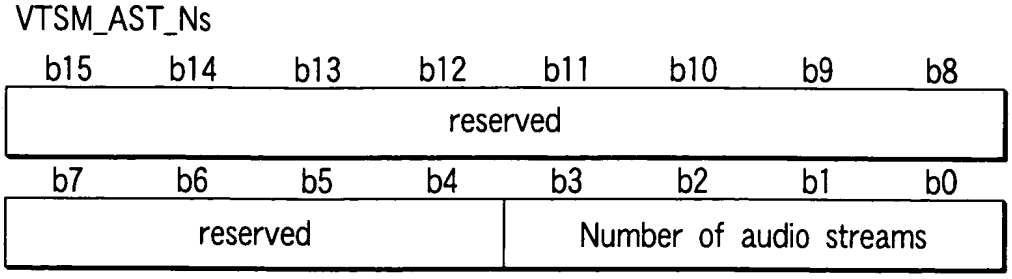


FIG. 35

VTSM_SPST_ATR

b47	b46	b45	b44	b43	b42	b41	b40
Sub-picture coding mode			reserved			reserved	
b39	b38	b37	b36	b35	b34	b33	b32
reserved							
b31	b30	b29	b28	b27	b26	b25	b24
reserved							
b23	b22	b21	b20	b19	b18	b17	b16
reserved							
b15	b14	b13	b12	b11	b10	b9	b8
reserved							
b7	b6	b5	b4	b3	b2	b1	b0
reserved							

FIG. 36

VTS_V_ATR

b15	b14	b13	b12	b11	b10	b9	b8
Video compression mode		TV system		Aspect ratio		Display mode	
b7	b6	b5	b4	b3	b2	b1	b0
line21_ switch_1	line21_ switch_2	Source picture resolution				reserved	

Source picture letterboxed

Film camera mode

FIG. 37

Contents of audio stream attribute VTS_AST_ATR

b63	b62	b61	b60	b59	b58	b57	b56
Audio coding mode			Multi-channel extension	Audio type		Application ID	

b55	b54	b53	b52	b51	b50	b49	b48
Quantization		Sampling frequency		reserved (0)	Number of audio channels		

b47	b46	b45	b44	b43	b42	b41	b40
Special code (Upper bits)							

b39	b38	b37	b36	b35	b34	b33	b32
Special code (Lower bits)							

b31	b30	b29	b28	b27	b26	b25	b24
Reserved specific code (0)							

b23	b22	b21	b20	b19	b18	b17	b16
reserved (0)							

b15	b14	b13	b12	b11	b10	b9	b8
reserved (0)							

b7	b6	b5	b4	b3	b2	b1	b0
Application information							

FIG. 38

Contents of sub-picture stream attribute VTS_SPST_ATR

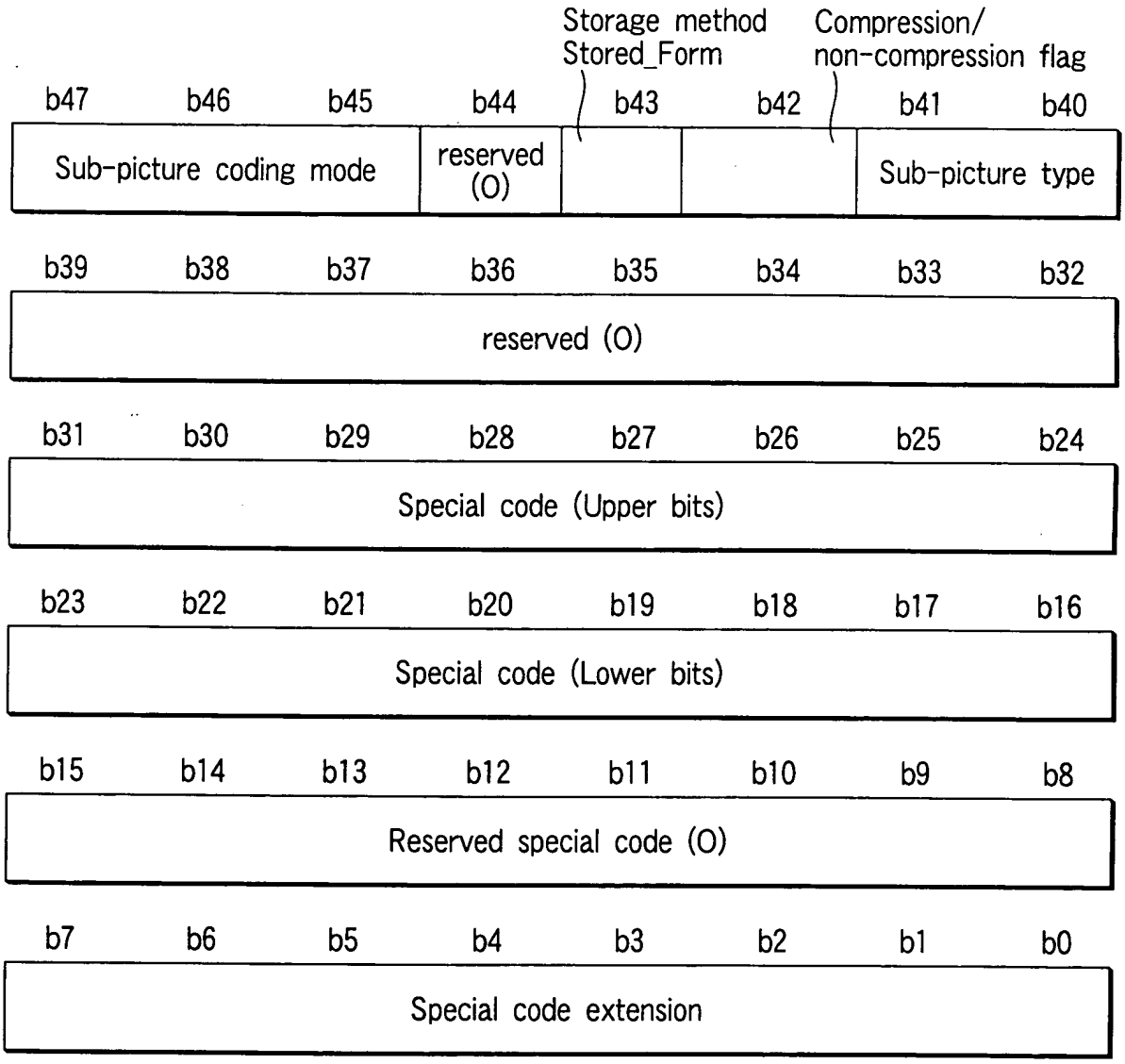


FIG. 39

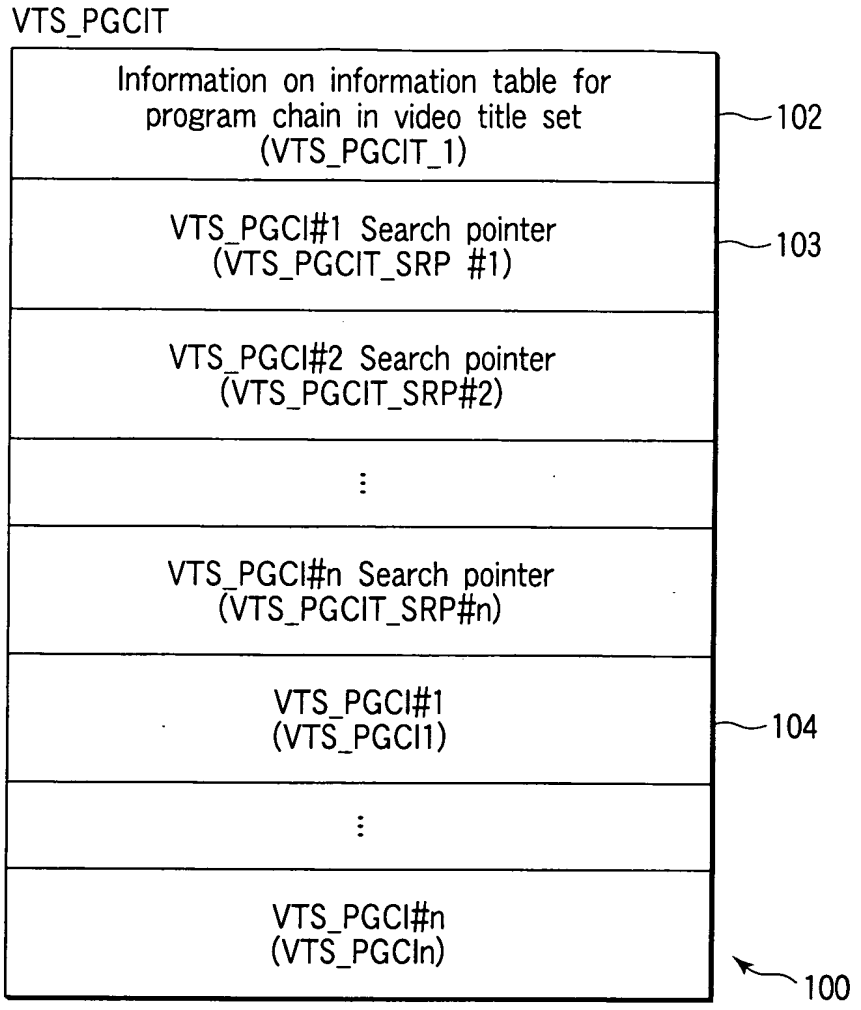


FIG. 40

VTS_PGCIT_I	(Description order)
Contents	
VTS_PGC_Ns	Number of VTS_PGCs
VTS_PGCIT_EA	End address of VTS_PGCIT

FIG. 41

VTS_PGCIT_SRP	(Description order)
Contents	
VTS_PGC_CAT	VTS_PGC category
VTS_PGCI_SA	Start address of VTS_PGC information

FIG. 42

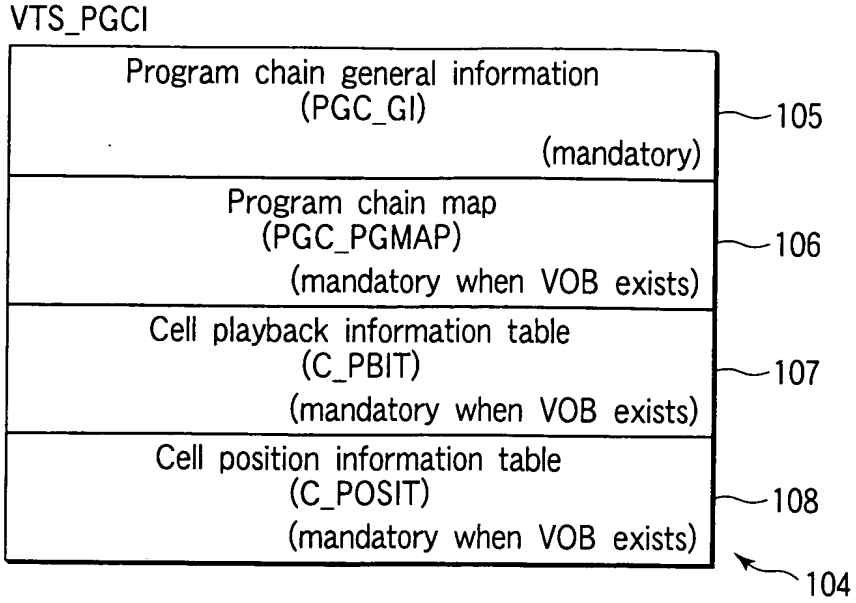


FIG. 43

FIG. 44A

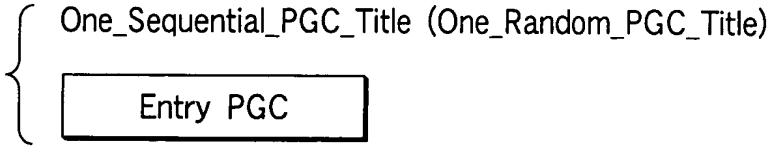
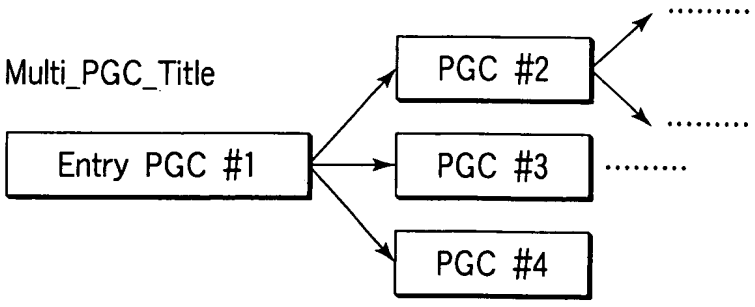


FIG. 44B



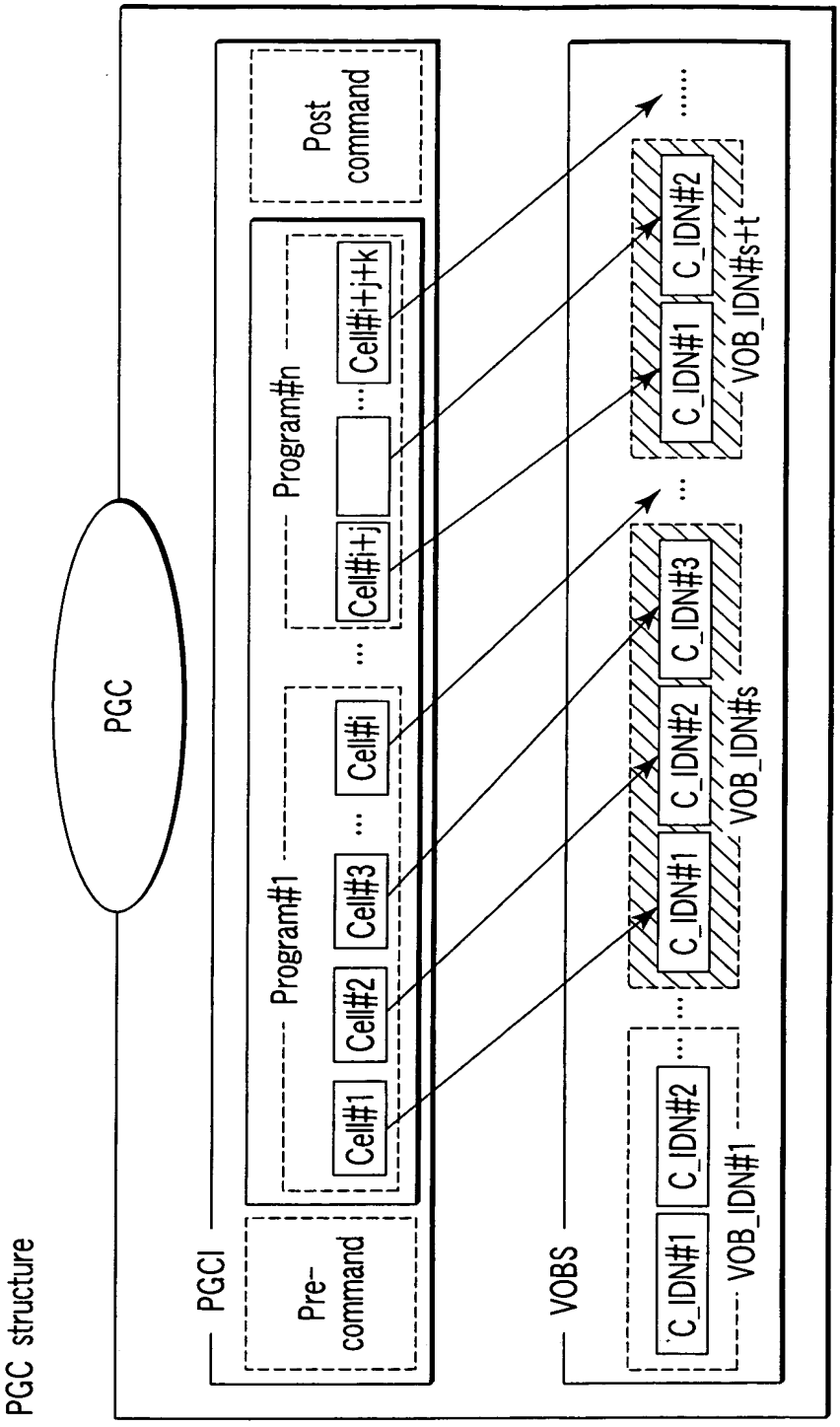

PGC structure
PGC
PGCI
Pre-command
Program#1
Cell#1
Cell#2
Cell#3
Cell#i
Program#n
Cell#i+j
Cell#i+j+k
Post command
VOBS
VOB_IDN#1
C_IDN#1
C_IDN#2
VOB_IDN#s
C_IDN#1
C_IDN#2
C_IDN#3
VOB_IDN#s+t
C_IDN#1
C_IDN#2

FIG. 45

PGCI structure

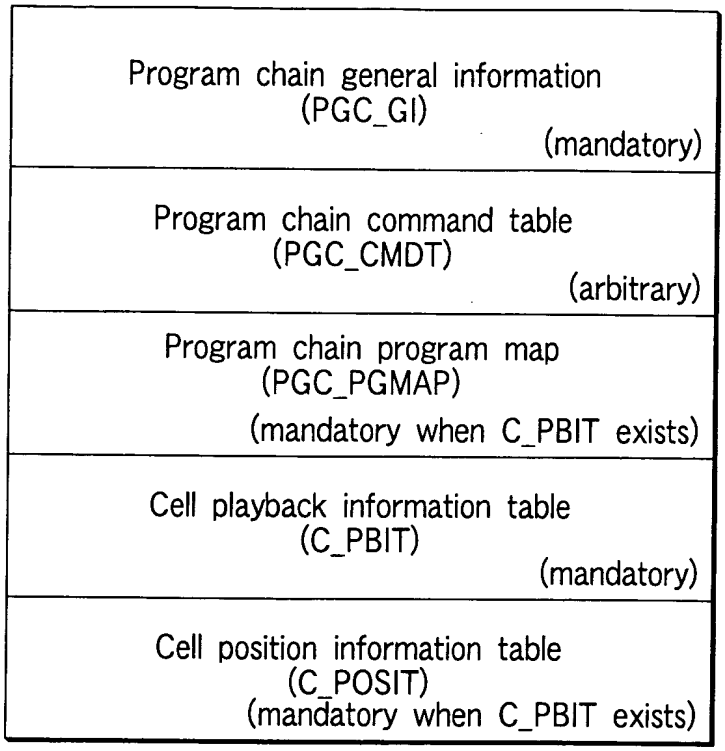


FIG. 46

PGC_CNT

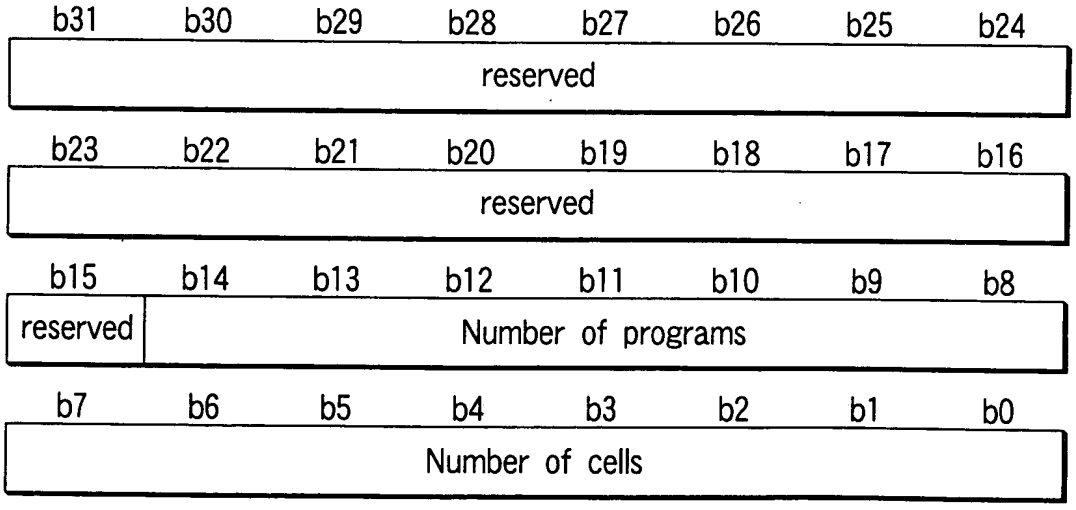


FIG. 48

PGC_GI

(Description order)

RBP		Contents	Number of bytes
0 to 3	(1) PGC_CNT	PGC Contents	4 bytes
4 to 7	(2) PGC_PB_TM	PGC Playback Time	4 bytes
8 to 11	(3) PGC_UOP_CTL	PGC User Operation Control	4 bytes
12 to 27	(4) PGC_AST_CTLT	PGC Audio stream Control Table	16 bytes
28 to 155	(5) PGC_SPST_CTLT	PGC Sub-picture stream Control Table	128 bytes
156 to 163	(6) PGC_NV_CTL	PGC Navigation Control	8 bytes
164 to 227	(7) PGC_SP_PLT	PGC Sub-picture Palette	4 bytes × 16
228 to 229	(8) PGC_CMDT_SA	Start address of PGC_CMDT	2 bytes
230 to 231	(9) PGC_PGMAP_SA	Start address of PGC_PGMAP	2 bytes
232 to 233	(10) C_PBIT_SA	Start address of C_PBIT	2 bytes
234 to 235	(11) C_POSIT_SA	Start address of C_POSIT	2 bytes
		Total	236 bytes

FIG. 47

PGC_SPST_CTL

b31	b30	b29	b28	b27	b26	b25	b24
Availability flag	HD-flag	reserved	Decoding sub-picture stream number for 4 : 3/HD				
b23	b22	b21	b20	b19	b18	b17	b16
reserved			Decoding sub-picture stream number for wide aspect ratio				
b15	b14	b13	b12	b11	b10	b9	b8
reserved			Decoding sub-picture stream number for letterbox				
b7	b6	b5	b4	b3	b2	b1	b0
reserved			Decoding sub-picture stream number for pan/scan				

FIG. 49

PGC_SP_PLT

b31	b30	b29	b28	b27	b26	b25	b24
Contrast							
b23	b22	b21	b20	b19	b18	b17	b16
Luminance signal (Y)							
b15	b14	b13	b12	b11	b10	b9	b8
Color difference signal (Cr = R-Y)							
b7	b6	b5	b4	b3	b2	b1	b0
Color difference signal (Cb = B-Y)							

FIG. 50

PGC_PGMAP

Entry cell number of program #1
Entry cell number of program #2
⋮
Entry cell number of program #n

FIG. 51

Entry cell number

	Contents
ECELLN	Entry cell number

FIG. 52

C_PBIT

Cell playback information #1 (C_PBI1)
Cell playback information #2 (C_PBI2)
⋮
Cell playback information #n (C_PBIn)

FIG. 53

C_PBI

	Contents
C_CAT	Cell category
C_PBTM	Cell playback time
C_FVOBU_SA	Start address of first VOBU in cell
C_LVOBU_SA	Start address of last VOBU in cell

FIG. 54

C_POSI

Cell position information #1 (C_POSIT1)
⋮
Cell position information #n (C_POSITn)

FIG. 55

C_POSI

	Contents
C_VOB_IDN	VOB ID number in cell
C_IDN	ID number of the cell

FIG. 56

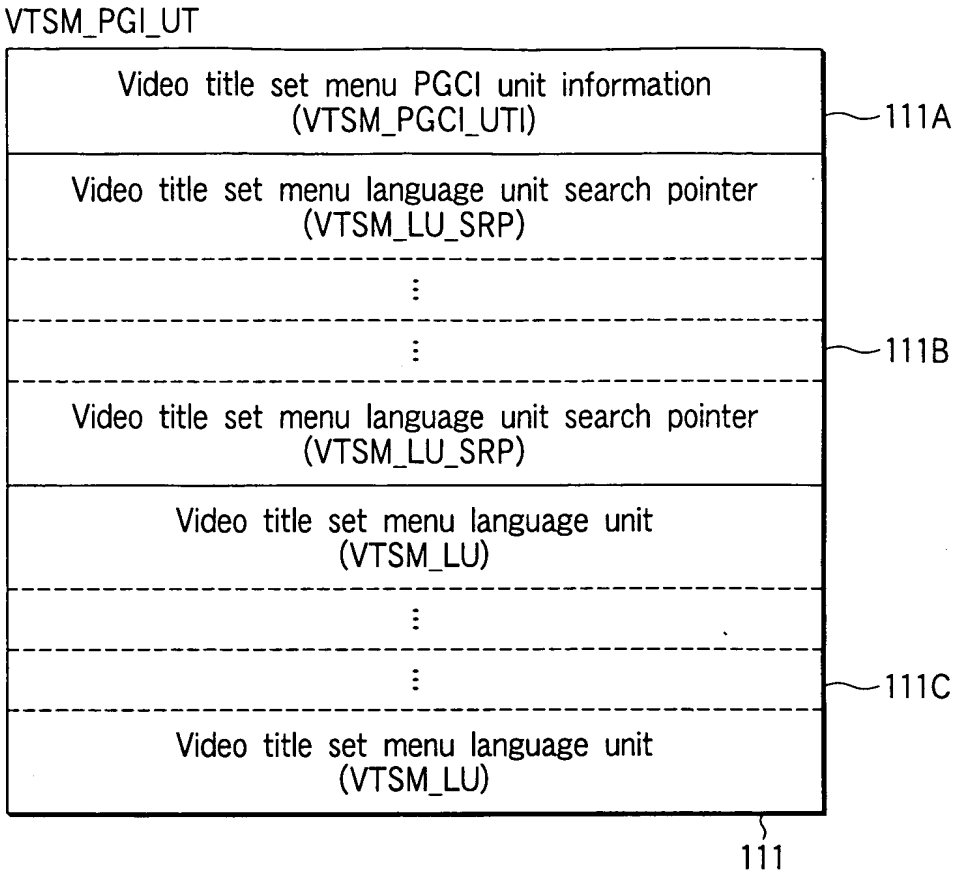


FIG. 57

VTSM_PGCI_UTI

	Contents
VTSM_LU_Ns	Number of video title set menu language units
VTSM_PGCI_UT_EA	End address of video title set menu language unit

FIG. 58

VTSM_LU_SRP

	Contents
VTSM_LCD	Video title set menu language code
VTSM_LU_SA	Start address of video title set menu language unit

FIG. 59

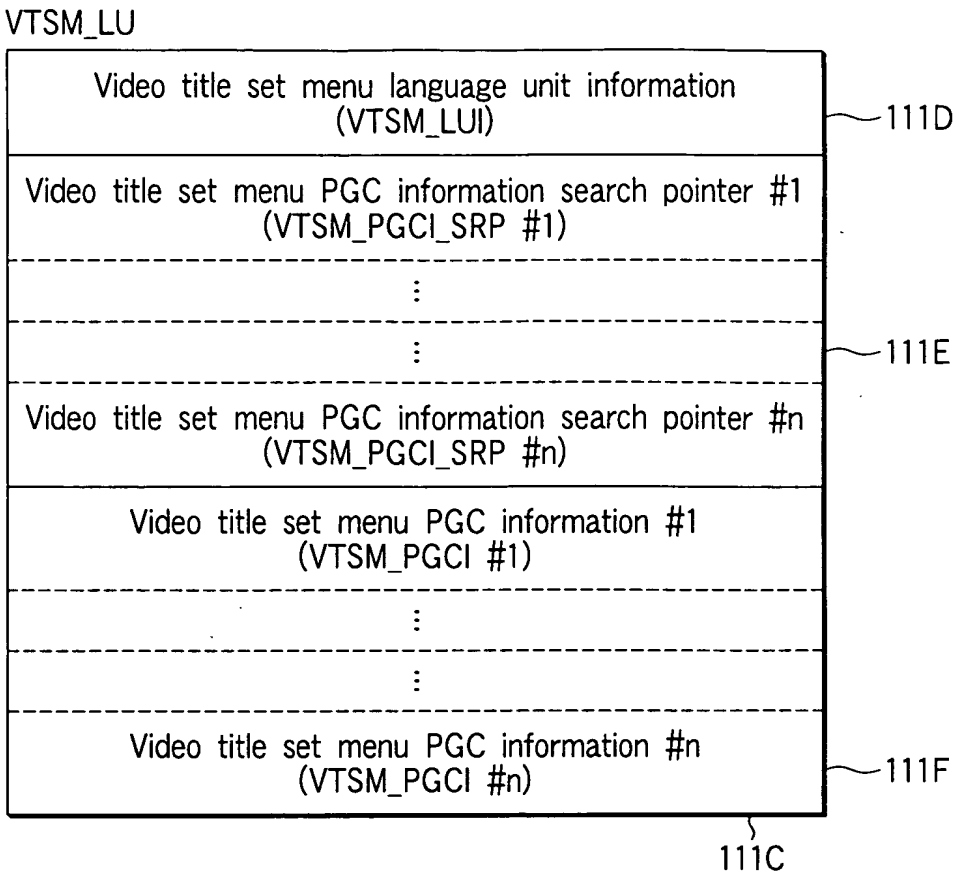


FIG. 60

VTSM_LUI

	Contents
VTSM_PGC_Ns	Number of VTSM program chain information items
VTSM_LU_EA	End address of video title set menu PGC information

FIG. 61

VTSM_PGCI_SRP

	Contents
VTSM_PGC_CAT	Category of program chain of video title set menu
VTSM_PGCI_SA	Start address of VTSM program chain information

FIG. 62

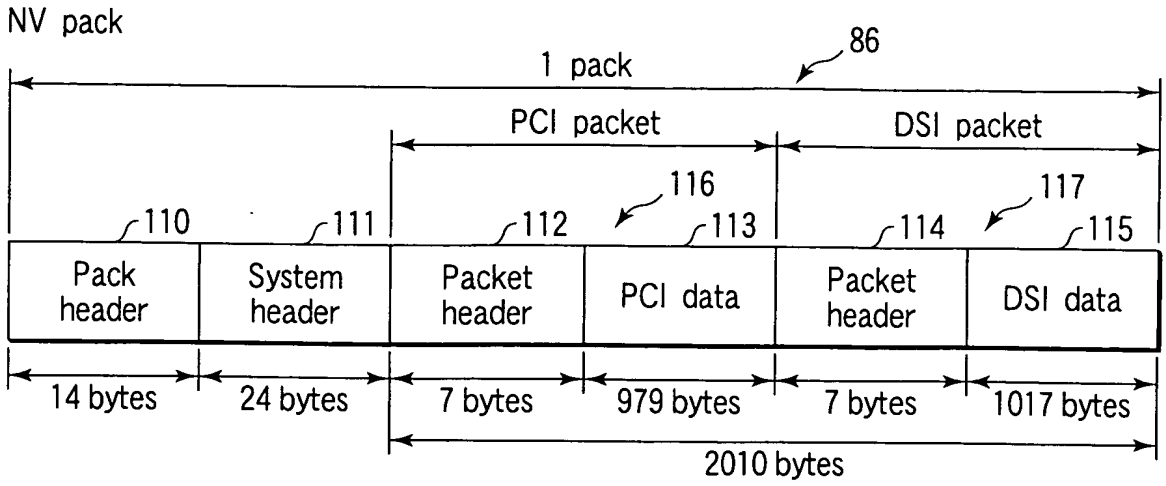


FIG. 63

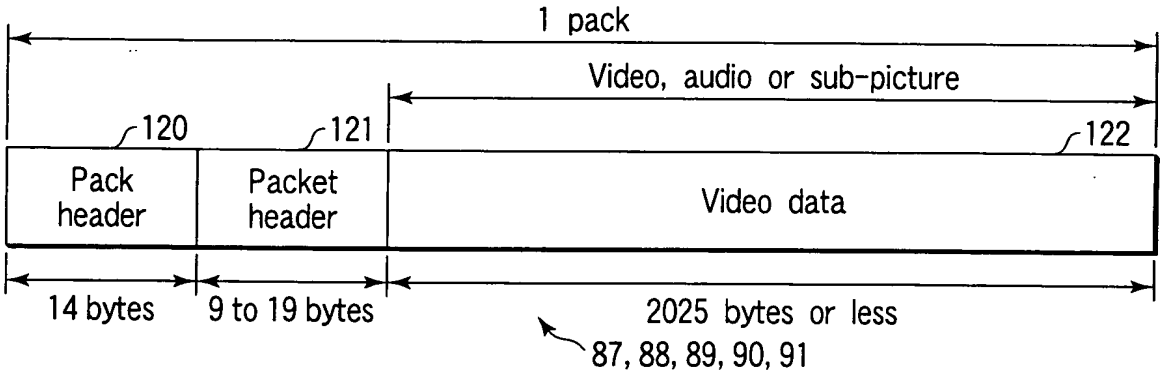


FIG. 64

PCI (Description order)

	Contents	Number of bytes
PCI_GI	PCI general information	60 bytes
NSML_AGLI	Non-Angle information for seamless	36 bytes
HLI	Highlight information	766 bytes
RECI	Storage information	117 bytes
	Total	979 bytes

FIG. 65

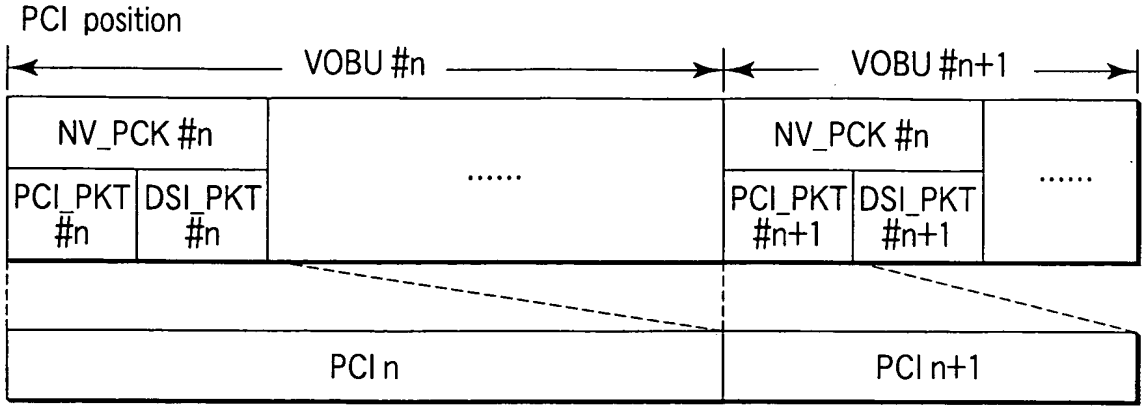


FIG. 66

PCI_GI (Description order)

	Contents	Number of bytes
(1) NV_PCK_LBN	LBN of Navigation pack	4 bytes
(2) VOBU_CAT	Category of VOBU	2 bytes
reserved	reserved	2 bytes
(3) VOBU_UOP_CTL	User Operation control of VOBU	4 bytes
(4) VOBU_S_PTM	Start PTM of VOBU	4 bytes
(5) VOBU_E_PTM	End PTM of VOBU	4 bytes
(6) VOBU_SE_E_PTM	End PTM of sequence end in VOBU	4 bytes
(7) C_ELTM	Cell Elapse Time	4 bytes
reserved	reserved	32 bytes
	Total	60 bytes

FIG. 67

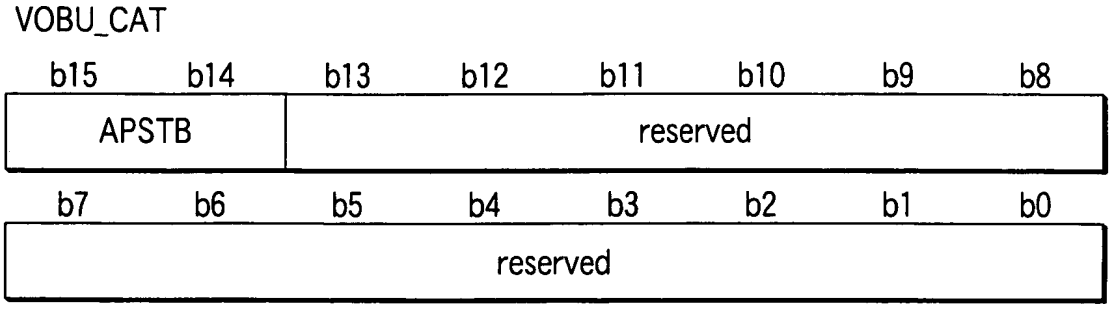


FIG. 68

NSML_AGLI

	Contents
NSML_AGL_C1_DSTA	Address of destination VOBU in AGI_C1
NSML_AGL_C2_DSTA	Address of destination VOBU in AGI_C2
NSML_AGL_C3_DSTA	Address of destination VOBU in AGI_C3
NSML_AGL_C4_DSTA	Address of destination VOBU in AGI_C4
NSML_AGL_C5_DSTA	Address of destination VOBU in AGI_C5
NSML_AGL_C6_DSTA	Address of destination VOBU in AGI_C6
NSML_AGL_C7_DSTA	Address of destination VOBU in AGI_C7
NSML_AGL_C8_DSTA	Address of destination VOBU in AGI_C8
NSML_AGL_C9_DSTA	Address of destination VOBU in AGI_C9

FIG. 69

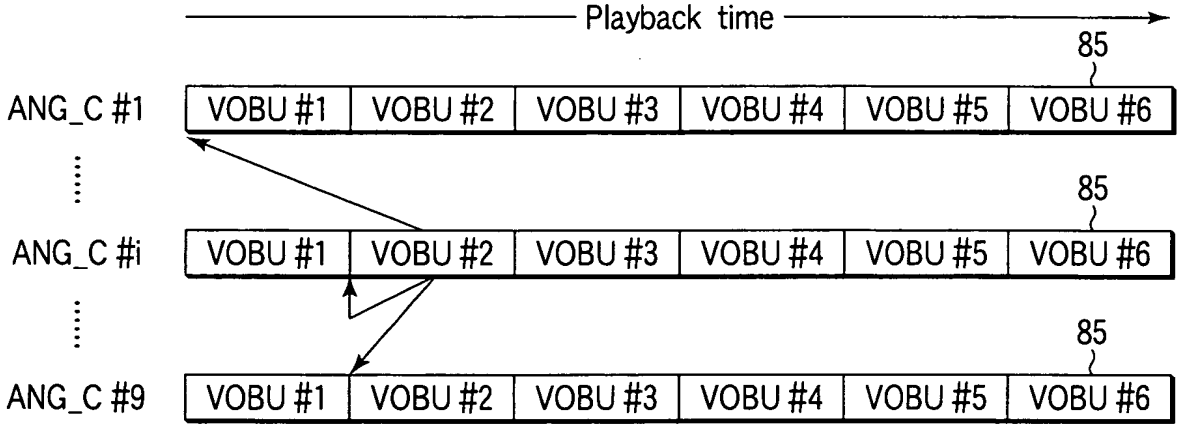


FIG. 70

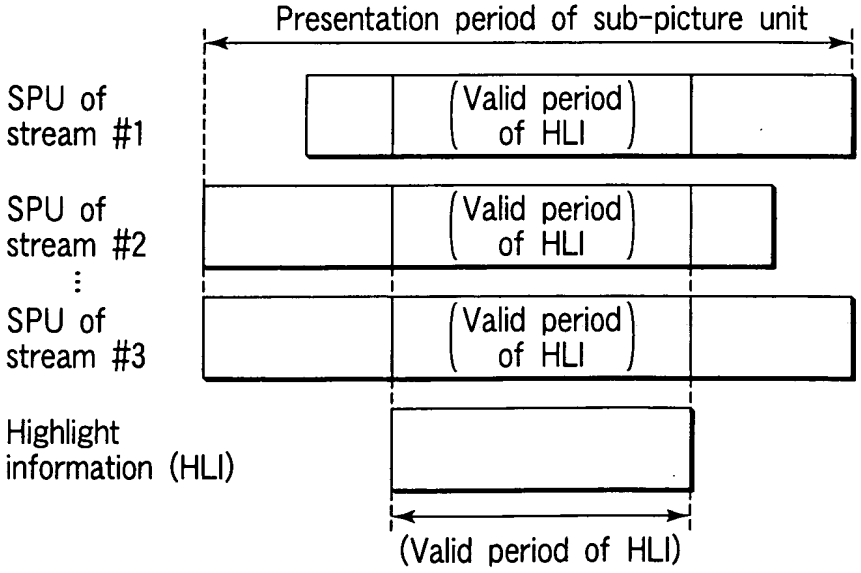


FIG. 71

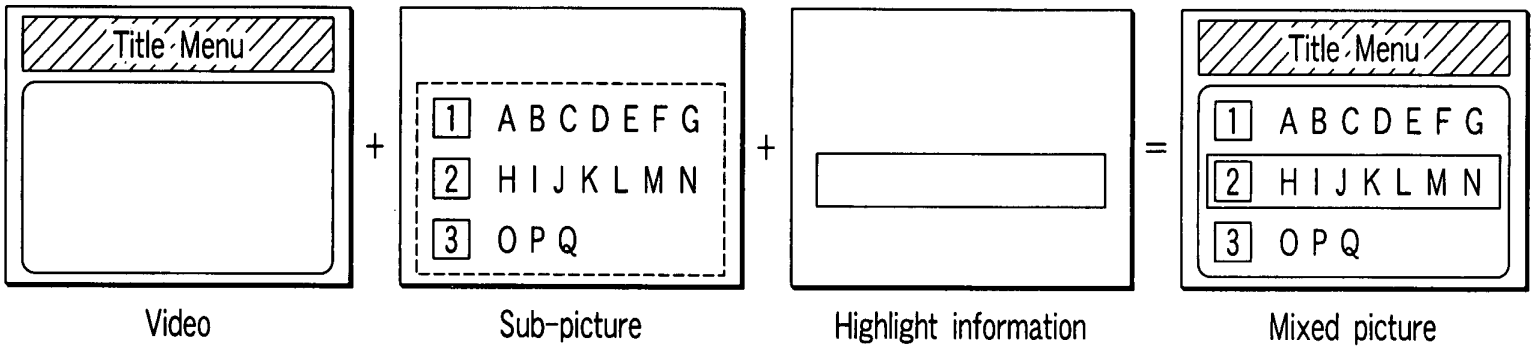


FIG. 72

HLI

	Contents	Number of bytes
HL_GI	Highlight general information	22
BTN_COLIT	Button color information table	32×3
BTNIT	Button information table	18×36

FIG. 73

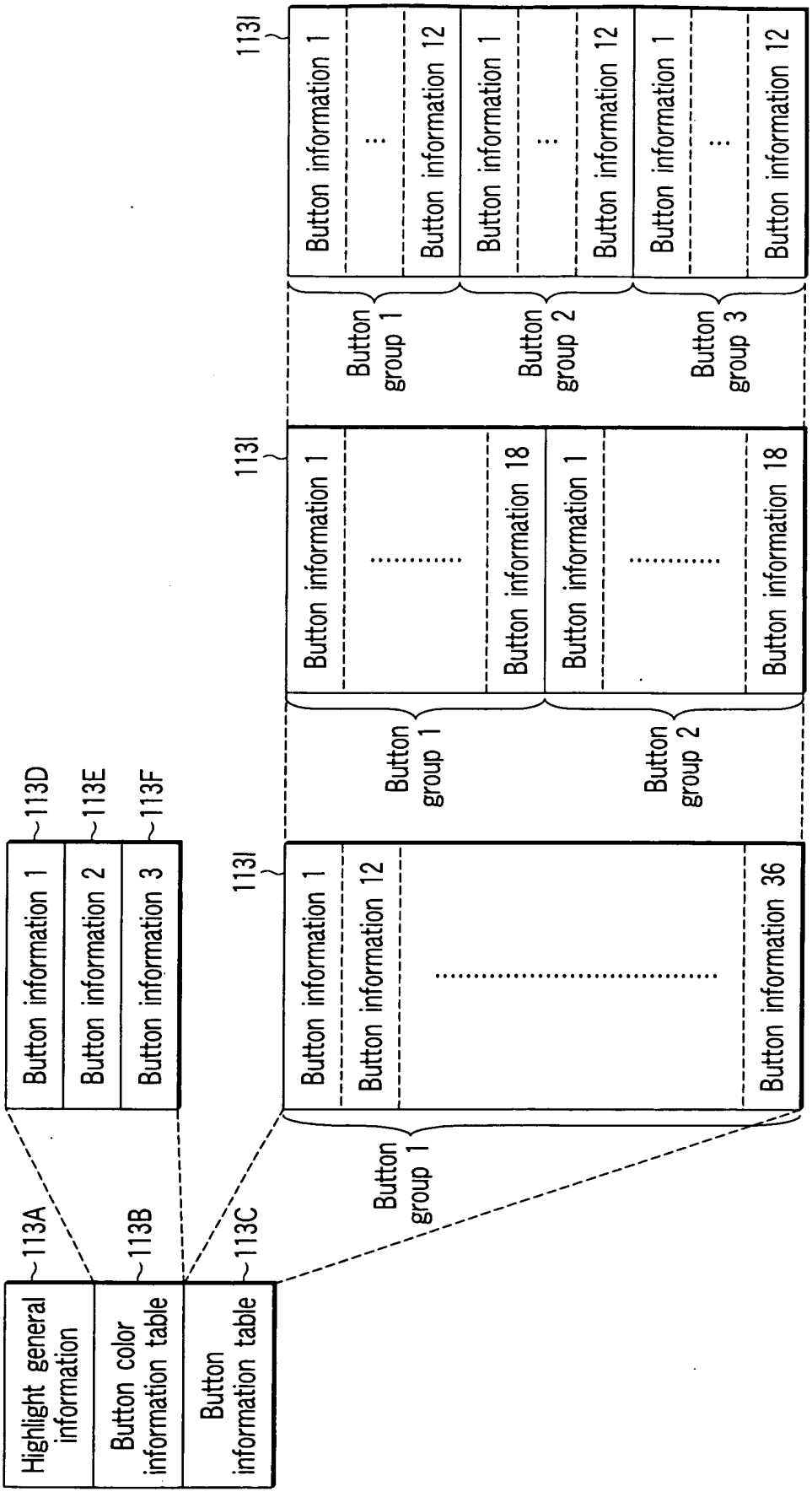

Highlight general information
Button color information table
Button information table
113A
113B
113C
Button information 1
Button information 2
Button information 3
113D
113E
113F
113I
Button information 1
Button information 12
Button information 36
Button group 1
Button information 1
Button information 18
Button group 1
Button group 2
Button information 1
Button information 12
Button group 1
Button group 2
Button group 3

FIG. 74

HL_GI

	Contents	Number of bytes
(1) HLI_SS	Status of HLI	2 bytes
(2) HLI_S_PTM	Start PTM of HLI	4 bytes
(3) HLI_E_PTM	End PTM of HLI	4 bytes
(4) BTN_SL_E_PTM	End PTM of Button select	4 bytes
(5) BTN_MD	Button mode	2 bytes
(6) BTN_OFN	Button Offset number	1 bytes
(7) BTN_Ns	Number of Buttons	1 bytes
(8) NSL_BTN_Ns	Number of Numerical Select Buttons	1 bytes
reserved	reserved	1 bytes
(9) FOSL_BTNN	Forcedly Selected Button number	1 bytes
(10) FOAC_BTNN	Forcedly Activated Button number	1 bytes
	Total	22 bytes

FIG. 75

HLI_SS

b15	b14	b13	b12	b11	b10	b9	b8
reserved							

b7	b6	b5	b4	b3	b2	b1	b0
reserved						HLI_SS	

FIG. 76

HLI_S_PTM

b31	b30	b29	b28	b27	b26	b25	b24
HLI_S_PTM [31..24]							

b23	b22	b21	b20	b19	b18	b17	b16
HLI_S_PTM [23..16]							

b15	b14	b13	b12	b11	b10	b9	b8
HLI_S_PTM [15..8]							

b7	b6	b5	b4	b3	b2	b1	b0
HLI_S_PTM [7..0]							

Start PTM of HLI = HLI_S_PTM [31..0] / 90000 [seconds]

FIG. 77

HLI_E_PTM

b31	b30	b29	b28	b27	b26	b25	b24
HLI_E_PTM [31 . . 24]							

b23	b22	b21	b20	b19	b18	b17	b16
HLI_E_PTM [23 . . 16]							

b15	b14	b13	b12	b11	b10	b9	b8
HLI_E_PTM [15 . . 8]							

b7	b6	b5	b4	b3	b2	b1	b0
HLI_E_PTM [7 . . 0]							

End PTM of HLI = HLI_E_PTM [31 . . 0]/90000 [seconds]

FIG. 78

BTN_SL_E_PTM

b31	b30	b29	b28	b27	b26	b25	b24
BTN_SL_E_PTM [31 . . 24]							

b23	b22	b21	b20	b19	b18	b17	b16
BTN_SL_E_PTM [23 . . 16]							

b15	b14	b13	b12	b11	b10	b9	b8
BTN_SL_E_PTM [15 . . 8]							

b7	b6	b5	b4	b3	b2	b1	b0
BTN_SL_E_PTM [7 . . 0]							

End PTM of Button select = BTN_SL_E_PTM [31 . . 0]/90000 [seconds]

FIG. 79

Button mode (BTN_MD)

b15	b14	b13	b12	b11	b10	b9	b8
HDGR	reserved	BTNGR_Ns		reserved	BTNGR1_DSP_TY		

b7	b6	b5	b4	b3	b2	b1	b0
reserved	BTNGR2_DSP_TY			reserved	BTNGR3_DSP_TY		

FIG. 80

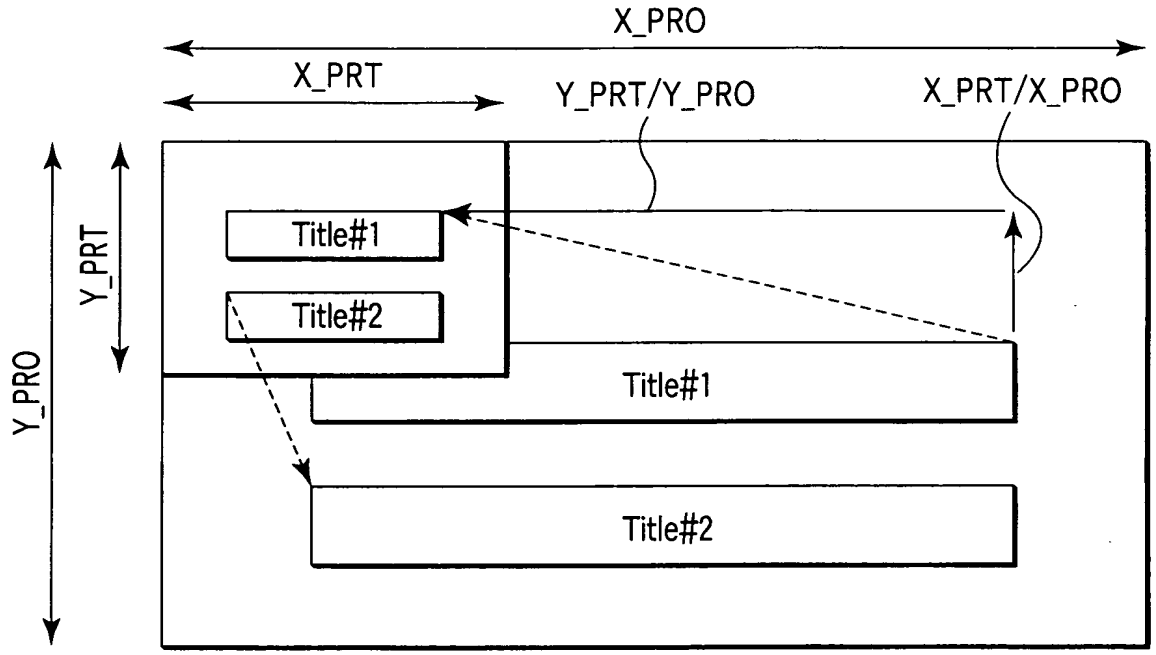


FIG. 81

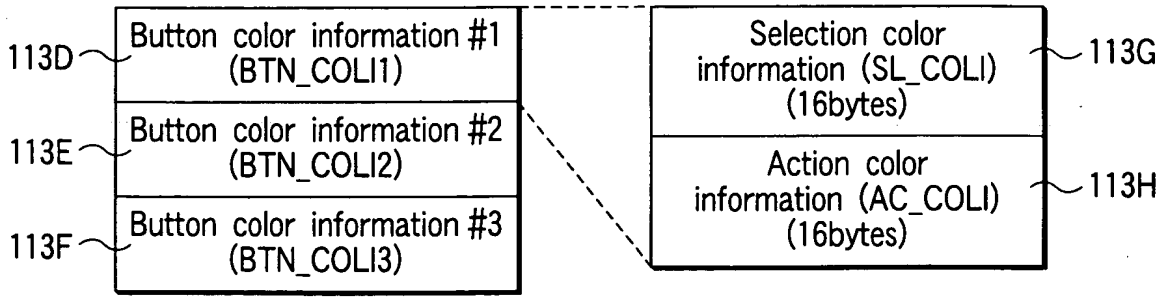


FIG. 82

Selection color information (SL_COLI)

b127	b126	b125	b124	b123	b122	b121	b120
Selection contrast of pixel 16				Selection color code of pixel 16			
b119	b118	b117	b116	b115	b114	b113	b112
Selection contrast of pixel 15				Selection color code of pixel 15			
b111	b110	b109	b108	b107	b106	b105	b104
Selection contrast of pixel 14				Selection color code of pixel 14			
b103	b102	b101	b100	b99	b98	b97	b96
Selection contrast of pixel 13				Selection color code of pixel 13			
b95	b94	b93	b92	b91	b90	b89	b88
Selection contrast of pixel 12				Selection color code of pixel 12			
b87	b86	b85	b84	b83	b82	b81	b80
Selection contrast of pixel 11				Selection color code of pixel 11			
b79	b78	b77	b76	b75	b74	b73	b72
Selection contrast of pixel 10				Selection color code of pixel 10			
b71	b70	b69	b68	b67	b66	b65	b64
Selection contrast of pixel 9				Selection color code of pixel 9			
b63	b62	b61	b60	b59	b58	b57	b56
Selection contrast of pixel 8				Selection color code of pixel 8			
b55	b54	b53	b52	b51	b50	b49	b48
Selection contrast of pixel 7				Selection color code of pixel 7			
b47	b46	b45	b44	b43	b42	b41	b40
Selection contrast of pixel 6				Selection color code of pixel 6			
b39	b38	b37	b36	b35	b34	b33	b32
Selection contrast of pixel 5				Selection color code of pixel 5			
b31	b30	b29	b28	b27	b26	b25	b24
Selection contrast of pixel 4				Selection color code of pixel 4			
b23	b22	b21	b20	b19	b18	b17	b16
Selection contrast of pixel 3				Selection color code of pixel 3			
b15	b14	b13	b12	b11	b10	b9	b8
Selection contrast of pixel 2				Selection color code of pixel 2			
b7	b6	b5	b4	b3	b2	b1	b0
Selection contrast of pixel 1				Selection color code of pixel 1			

FIG. 83

Action color information (AC_COLI)

b127	b126	b125	b124	b123	b122	b121	b120
Action contrast of pixel 16				Action color code of pixel 16			
b119	b118	b117	b116	b115	b114	b113	b112
Action contrast of pixel 15				Action color code of pixel 15			
b111	b110	b109	b108	b107	b106	b105	b104
Action contrast of pixel 14				Action color code of pixel 14			
b103	b102	b101	b100	b99	b98	b97	b96
Action contrast of pixel 13				Action color code of pixel 13			
b95	b94	b93	b92	b91	b90	b89	b88
Action contrast of pixel 12				Action color code of pixel 12			
b87	b86	b85	b84	b83	b82	b81	b80
Action contrast of pixel 11				Action color code of pixel 11			
b79	b78	b77	b76	b75	b74	b73	b72
Action contrast of pixel 10				Action color code of pixel 10			
b71	b70	b69	b68	b67	b66	b65	b64
Action contrast of pixel 9				Action color code of pixel 9			
b63	b62	b61	b60	b59	b58	b57	b56
Action contrast of pixel 8				Action color code of pixel 8			
b55	b54	b53	b52	b51	b50	b49	b48
Action contrast of pixel 7				Action color code of pixel 7			
b47	b46	b45	b44	b43	b42	b41	b40
Action contrast of pixel 6				Action color code of pixel 6			
b39	b38	b37	b36	b35	b34	b33	b32
Action contrast of pixel 5				Action color code of pixel 5			
b31	b30	b29	b28	b27	b26	b25	b24
Action contrast of pixel 4				Action color code of pixel 4			
b23	b22	b21	b20	b19	b18	b17	b16
Action contrast of pixel 3				Action color code of pixel 3			
b15	b14	b13	b12	b11	b10	b9	b8
Action contrast of pixel 2				Action color code of pixel 2			
b7	b6	b5	b4	b3	b2	b1	b0
Action contrast of pixel 1				Action color code of pixel 1			

FIG. 84

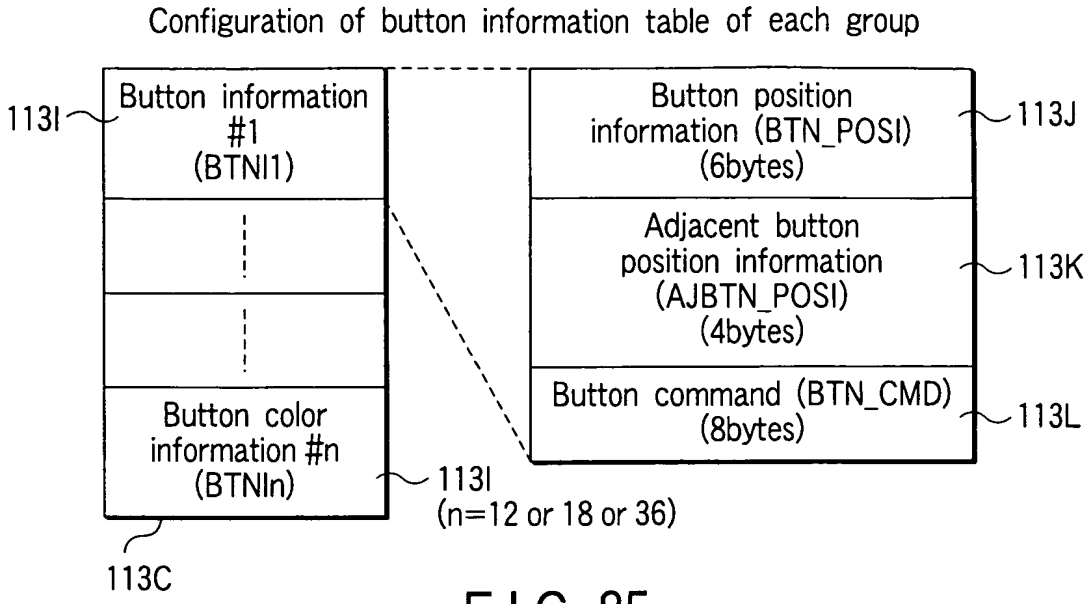

Configuration of button information table of each group
Button information #1 (BTNI1)
Button color information #n (BTNIn)
113I
113I (n=12 or 18 or 36)
113C
Button position information (BTN_POSI) (6bytes)
Adjacent button position information (AJBTN_POSI) (4bytes)
Button command (BTN_CMD) (8bytes)
113J
113K
113L

FIG. 85

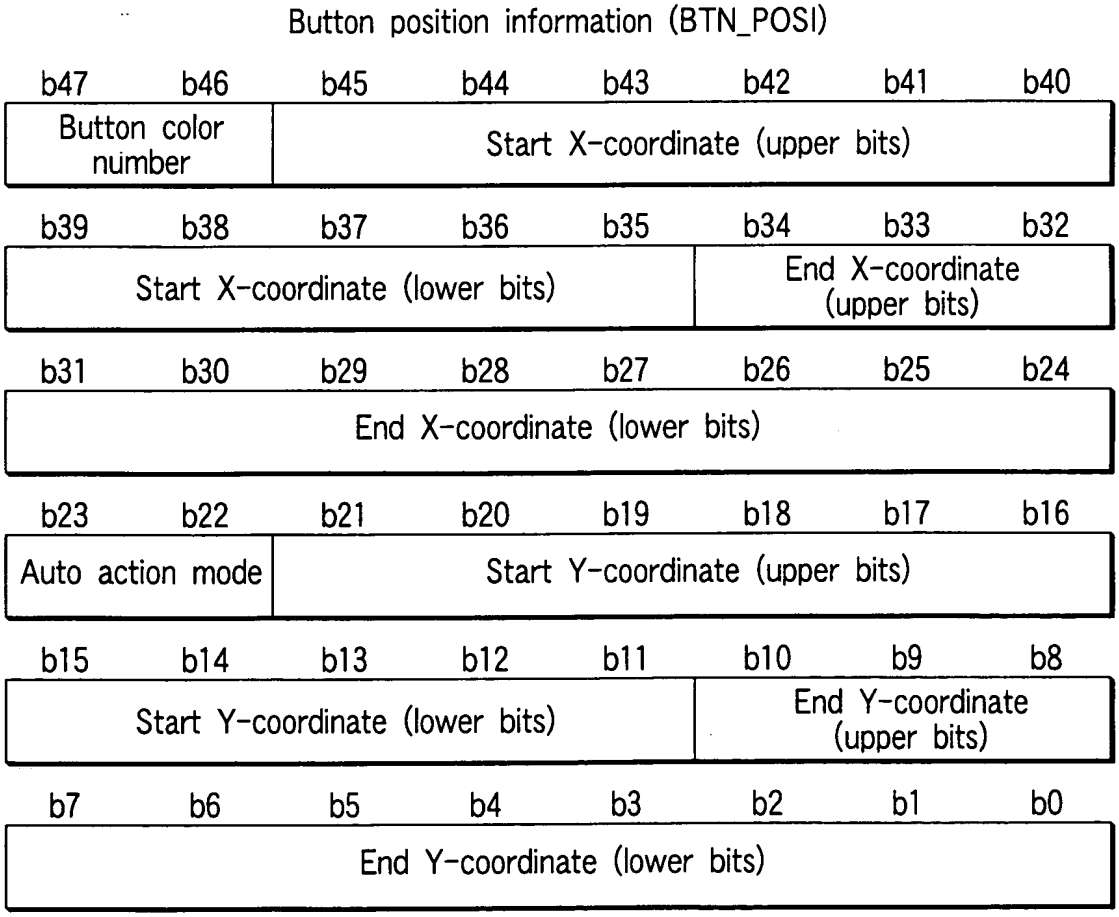

Button position information (BTN_POSI)
b47 b46 b45 b44 b43 b42 b41 b40
Button color number
Start X-coordinate (upper bits)
b39 b38 b37 b36 b35 b34 b33 b32
Start X-coordinate (lower bits)
End X-coordinate (upper bits)
b31 b30 b29 b28 b27 b26 b25 b24
End X-coordinate (lower bits)
b23 b22 b21 b20 b19 b18 b17 b16
Auto action mode
Start Y-coordinate (upper bits)
b15 b14 b13 b12 b11 b10 b9 b8
Start Y-coordinate (lower bits)
End Y-coordinate (upper bits)
b7 b6 b5 b4 b3 b2 b1 b0
End Y-coordinate (lower bits)

FIG. 86

	TV system				
	525/60	625/50	HDTV-1280	HDTV-1440	HDTV-1920
X-coordinate value	0~719	0~719	0~1279	0~1439	0~1919
Y-coordinate value	2~479	2~574	2~719	2~1079	2~1079

FIG. 87

Adjacent button position information (AJBTN_POSI)

b31	b30	b29	b28	b27	b26	b25	b24
reserved			Upper button number				
b23	b22	b21	b20	b19	b18	b17	b16
reserved			Lower button number				
b15	b14	b13	b12	b11	b10	b9	b8
reserved			Left button number				
b7	b6	b5	b4	b3	b2	b1	b0
reserved			Right button number				

FIG. 88

RECI (Description order)

	Contents	Number of bytes
ISRC_V	ISRC of video data in Video stream	10 bytes
ISRC_A0	ISRC of audio data in Decoding Audio stream #0	10 bytes
ISRC_A1	ISRC of audio data in Decoding Audio stream #1	10 bytes
ISRC_A2	ISRC of audio data in Decoding Audio stream #2	10 bytes
ISRC_A3	ISRC of audio data in Decoding Audio stream #3	10 bytes
ISRC_A4	ISRC of audio data in Decoding Audio stream #4	10 bytes
ISRC_A5	ISRC of audio data in Decoding Audio stream #5	10 bytes
ISRC_A6	ISRC of audio data in Decoding Audio stream #6	10 bytes
ISRC_A7	ISRC of audio data in Decoding Audio stream #7	10 bytes
ISRC_SP0	ISRC of SP data in Decording SP stream #0,#8,#16 or #24	10 bytes
ISRC_SP1	ISRC of SP data in Decording SP stream #1,#9,#17 or #25	10 bytes
ISRC_SP2	ISRC of SP data in Decording SP stream #2,#10,#18 or #26	10 bytes
ISRC_SP3	ISRC of SP data in Decording SP stream #3,#11,#19 or #27	10 bytes
ISRC_SP4	ISRC of SP data in Decording SP stream #4,#12,#20 or #28	10 bytes
ISRC_SP5	ISRC of SP data in Decording SP stream #5,#13,#21 or #29	10 bytes
ISRC_SP6	ISRC of SP data in Decording SP stream #6,#14,#22 or #30	10 bytes
ISRC_SP7	ISRC of SP data in Decording SP stream #7,#15,#23 or #31	10 bytes
ISRC_SP_SEL	Selected SP stream group for ISRC	1 byte
reserved	reserved	18 bytes
	Total	117 bytes

FIG. 89

DSI (Description order)

	Contents	Number of bytes
DSI_GI	DSI general information	32 bytes
SML_PBI	Seamless playback information	148 bytes
SML_AGLI	Angle information for seamless	54 bytes
VOBU_SRI	VOBU search information	168 bytes
SYNCI	Synchronous information	144 bytes
reserved	reserved	471 bytes
	Total	1017 bytes

FIG. 90

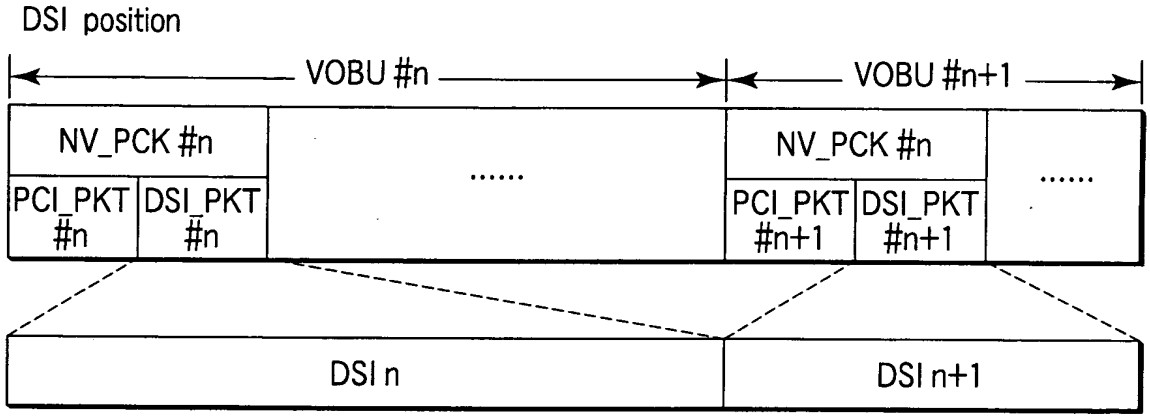


FIG. 91

DSI_GI

	Contents
NV_PCK_SCR	SCR of NV pack
NV_PCK_LBN	LBN of NV pack
VOBU_EA	End address of VOBU
VOBU_IP_EA	End address of the first reference picture
VOBU_VOB_IDN	VOB ID number of the VOBU
VOBU_C_IDN	Cell ID number of the VOBU

FIG. 92

CELL_ADP_ID

b7	b6	b5	b4	b3	b2	b1	b0
VOB_VERN	reserved					Adaptive disk type	

FIG. 93

SML_AGLI

	Contents
SML_AGL-C1_DSTA	Destination address of AGL_C #1
SML_AGL-C2_DSTA	Destination address of AGL_C #2
SML_AGL-C3_DSTA	Destination address of AGL_C #3
SML_AGL-C4_DSTA	Destination address of AGL_C #4
SML_AGL-C5_DSTA	Destination address of AGL_C #5
SML_AGL-C6_DSTA	Destination address of AGL_C #6
SML_AGL-C7_DSTA	Destination address of AGL_C #7
SML_AGL-C8_DSTA	Destination address of AGL_C #8
SML_AGL-C9_DSTA	Destination address of AGL_C #9

FIG. 94

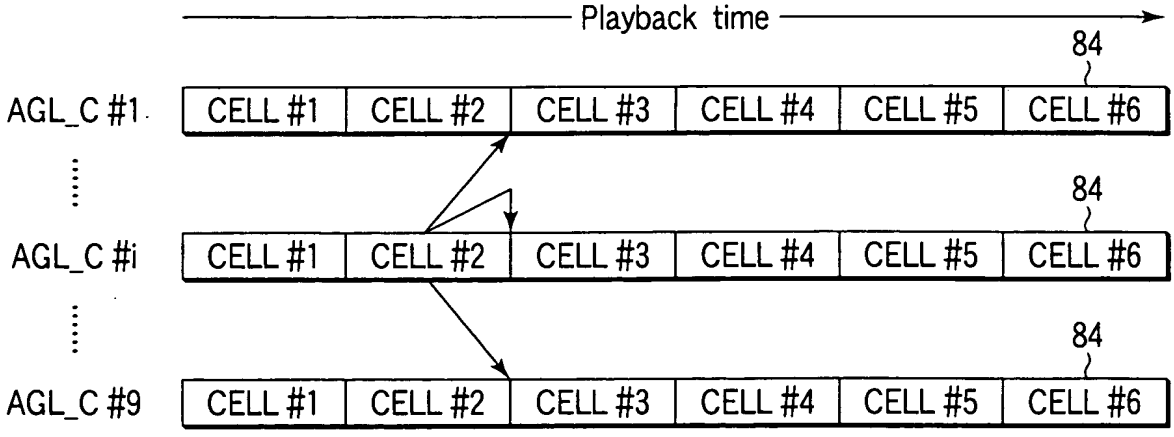


FIG. 95

VOBU_SRI

	Contents
FWDI 240	+ 240 VOBU start address and Video exist flag
FWDI 120	+ 120 VOBU start address and Video exist flag
FWDI 60	+ 60 VOBU start address and Video exist flag
FWDI 20	+ 20 VOBU start address and Video exist flag
FWDI 15	+ 15 VOBU start address and Video exist flag
FWDI 14	+ 14 VOBU start address and Video exist flag
FWDI 13	+ 13 VOBU start address and Video exist flag
FWDI 12	+ 12 VOBU start address and Video exist flag
FWDI 11	+ 11 VOBU start address and Video exist flag
FWDI 10	+ 10 VOBU start address and Video exist flag
FWDI 9	+ 9 VOBU start address and Video exist flag
FWDI 8	+ 8 VOBU start address and Video exist flag
FWDI 7	+ 7 VOBU start address and Video exist flag
FWDI 6	+ 6 VOBU start address and Video exist flag
FWDI 5	+ 5 VOBU start address and Video exist flag
FWDI 4	+ 4 VOBU start address and Video exist flag
FWDI 3	+ 3 VOBU start address and Video exist flag
FWDI 2	+ 2 VOBU start address and Video exist flag
FWDI 1	+ 1 VOBU start address and Video exist flag
BWDI Next	Next VOBU start address and Video exist flag
BWDI Prev	Previous VOBU start address and Video exist flag
BWDI 1	- 1 VOBU start address and Video exist flag
BWDI 2	- 2 VOBU start address and Video exist flag
BWDI 3	- 3 VOBU start address and Video exist flag
BWDI 4	- 4 VOBU start address and Video exist flag
BWDI 5	- 5 VOBU start address and Video exist flag
BWDI 6	- 6 VOBU start address and Video exist flag
BWDI 7	- 7 VOBU start address and Video exist flag
BWDI 8	- 8 VOBU start address and Video exist flag
BWDI 9	- 9 VOBU start address and Video exist flag
BWDI 10	- 10 VOBU start address and Video exist flag
BWDI 11	- 11 VOBU start address and Video exist flag
BWDI 12	- 12 VOBU start address and Video exist flag
BWDI 13	- 13 VOBU start address and Video exist flag
BWDI 14	- 14 VOBU start address and Video exist flag
BWDI 15	- 15 VOBU start address and Video exist flag
BWDI 20	- 20 VOBU start address and Video exist flag
BWDI 60	- 60 VOBU start address and Video exist flag
BWDI 120	- 120 VOBU start address and Video exist flag
BWDI 240	- 240 VOBU start address and Video exist flag

FIG. 96

Forward address (FWDIn)

b31	b30	b29	b28	b27	b26	b25	b24
V_FWD _Exist 1	V_FWD _Exist 2	FWDIn [29...24]					
b23	b22	b21	b20	b19	b18	b17	b16
FWDIn [23...16]							
b15	b14	b13	b12	b11	b10	b9	b8
FWDIn [15...8]							
b7	b6	b5	b4	b3	b2	b1	b0
FWDIn [7...0]							

FIG. 97

Backward address (BWDIn)

b31	b30	b29	b28	b27	b26	b25	b24
V_BWD _Exist 1	V_BWD _Exist 2	BWDIn [29...24]					
b23	b22	b21	b20	b19	b18	b17	b16
BWDIn [23...16]							
b15	b14	b13	b12	b11	b10	b9	b8
BWDIn [15...8]							
b7	b6	b5	b4	b3	b2	b1	b0
BWDIn [7...0]							

FIG. 98

SYNCI

	Contents
A_SYNCA 0 to 7	Target audio pack (A_PCK) address
SP_SYNCA 0 to 31	VOBU start address for target sub-picture pack (SP_PCK)

FIG. 99

SPRM (14) : Video player configuration (P_CFG)

b15	b14	b13	b12	b11	b10	b9	b8
reserved		reserved		Initial display aspect ratio		Current display mode	

b7	b6	b5	b4	b3	b2	b1	b0
reserved							

FIG. 100

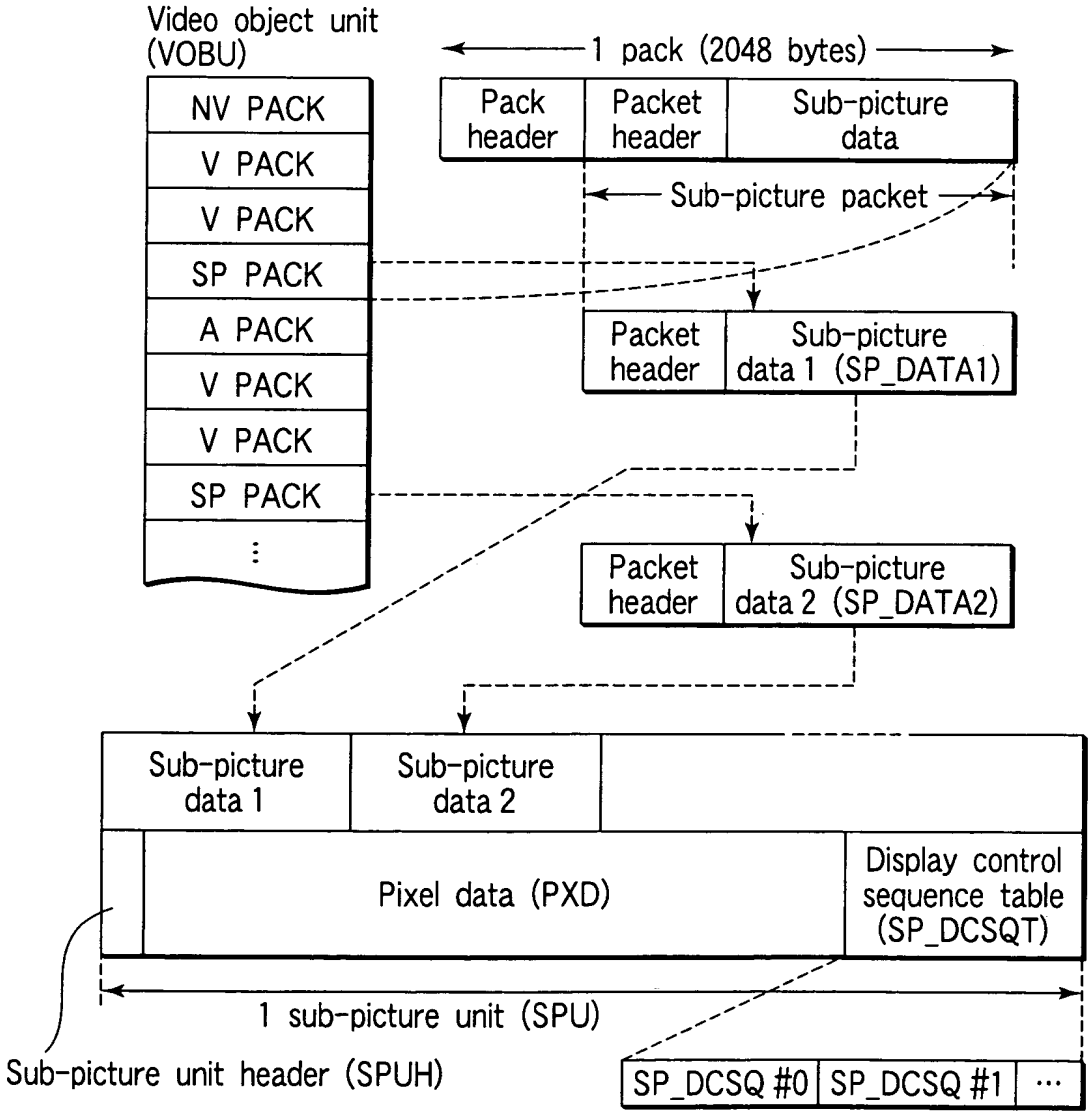


FIG. 102

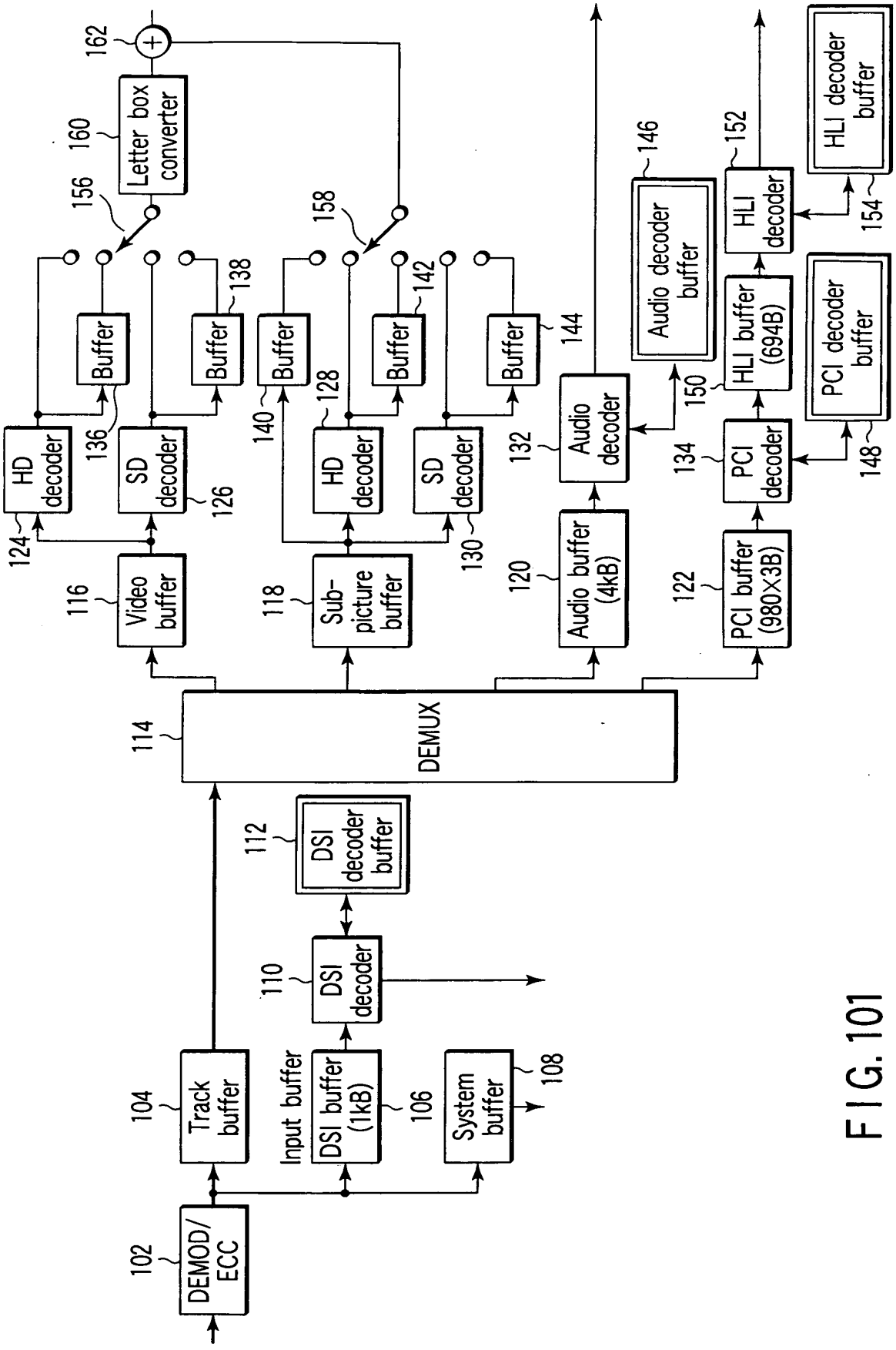

DEMOD/ ECC
102
Track buffer
104
Input buffer
DSI buffer (1kB)
106
System buffer
108
DSI decoder
110
DSI decoder buffer
112
DEMUX
114
Video buffer
116
Sub-picture buffer
118
Audio buffer (4kB)
120
PCI buffer (980×3B)
122
HD decoder
124
SD decoder
126
Buffer
136
Buffer
138
HD decoder
140
SD decoder
130
Buffer
128
Buffer
142
Audio decoder
132
Buffer
144
PCI decoder
134
HLI buffer (694B)
150
HLI decoder
152
Audio decoder buffer
146
PCI decoder buffer
148
HLI decoder buffer
154
Letter box converter
160
156
158
162

FIG. 101

Sub-picture unit (SPU) and sub-picture pack (SP_PCK)

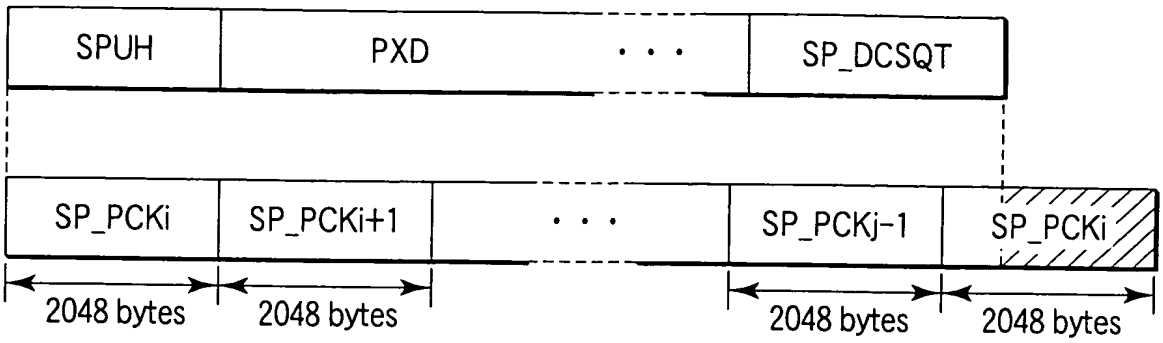


FIG. 103

Sub-picture unit header (SPUH)

Description order

	Contents	Number of bytes
(1)SPU_SZ	Size of sub-picture unit	4 bytes
(2)SP_DCSQT_SA	Start address of display control sequence table	4 bytes
(3)PXD_W	Width of pixel data	4 bytes
(4)PXD_H	Height of pixel data	4 bytes
(5)SP_CAT	Sub-picture category	1 bytes
reserved	reserved	1 bytes
	Total	18 bytes

FIG. 104

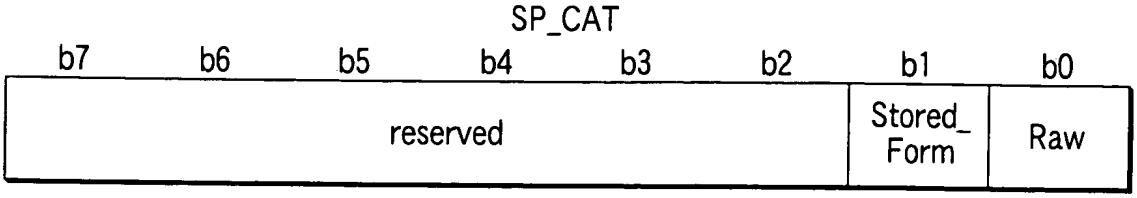


FIG. 105

Allocation of pixel data

Pixel name	Pixel data
Pixel 1	0000
Pixel 2	0001
Pixel 3	0010
Pixel 4	0011
Pixel 5	0100
Pixel 6	0101
Pixel 7	0110
Pixel 8	0111
Pixel 9	1000
Pixel 10	1001
Pixel 11	1010
Pixel 12	1011
Pixel 13	1100
Pixel 14	1101
Pixel 15	1110
Pixel 16	1111

FIG. 106

Pixel data allocation example (1)

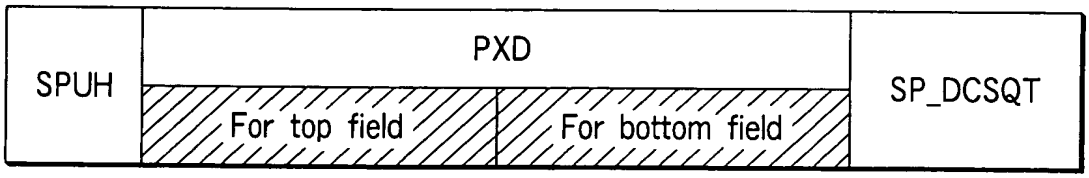


FIG. 107A

Pixel data allocation example (2)

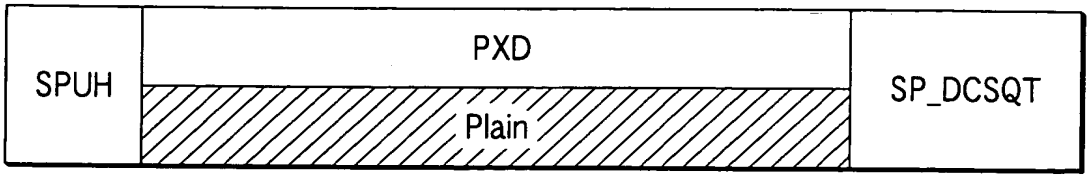


FIG. 107B

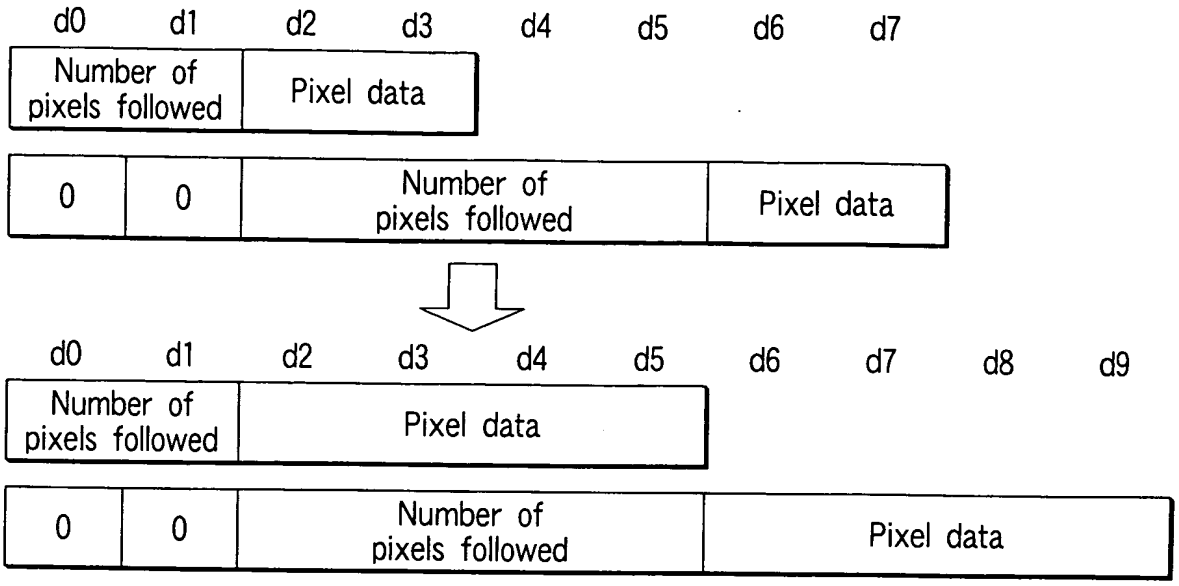


FIG. 108

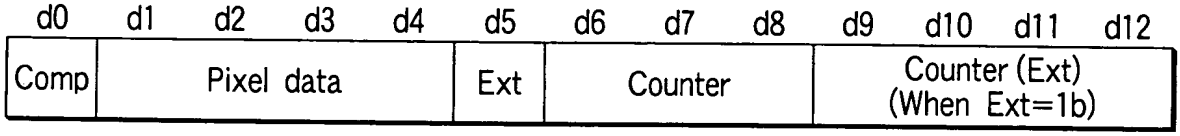


FIG. 109

FIG. 110A

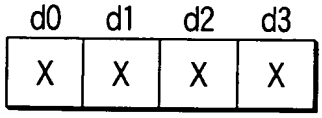


FIG. 110B

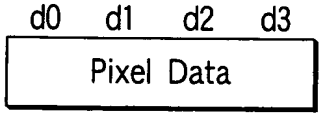


FIG. 110C

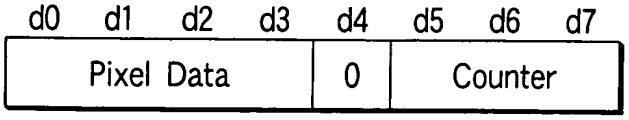


FIG. 110D

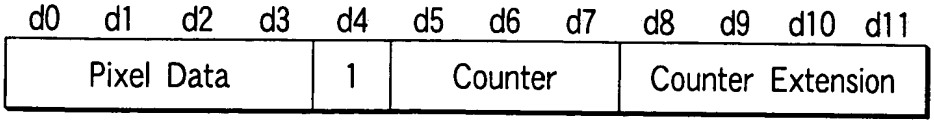
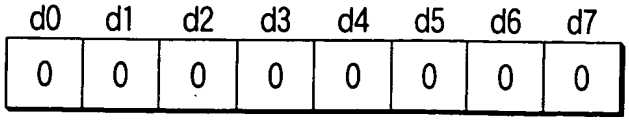


FIG. 110E



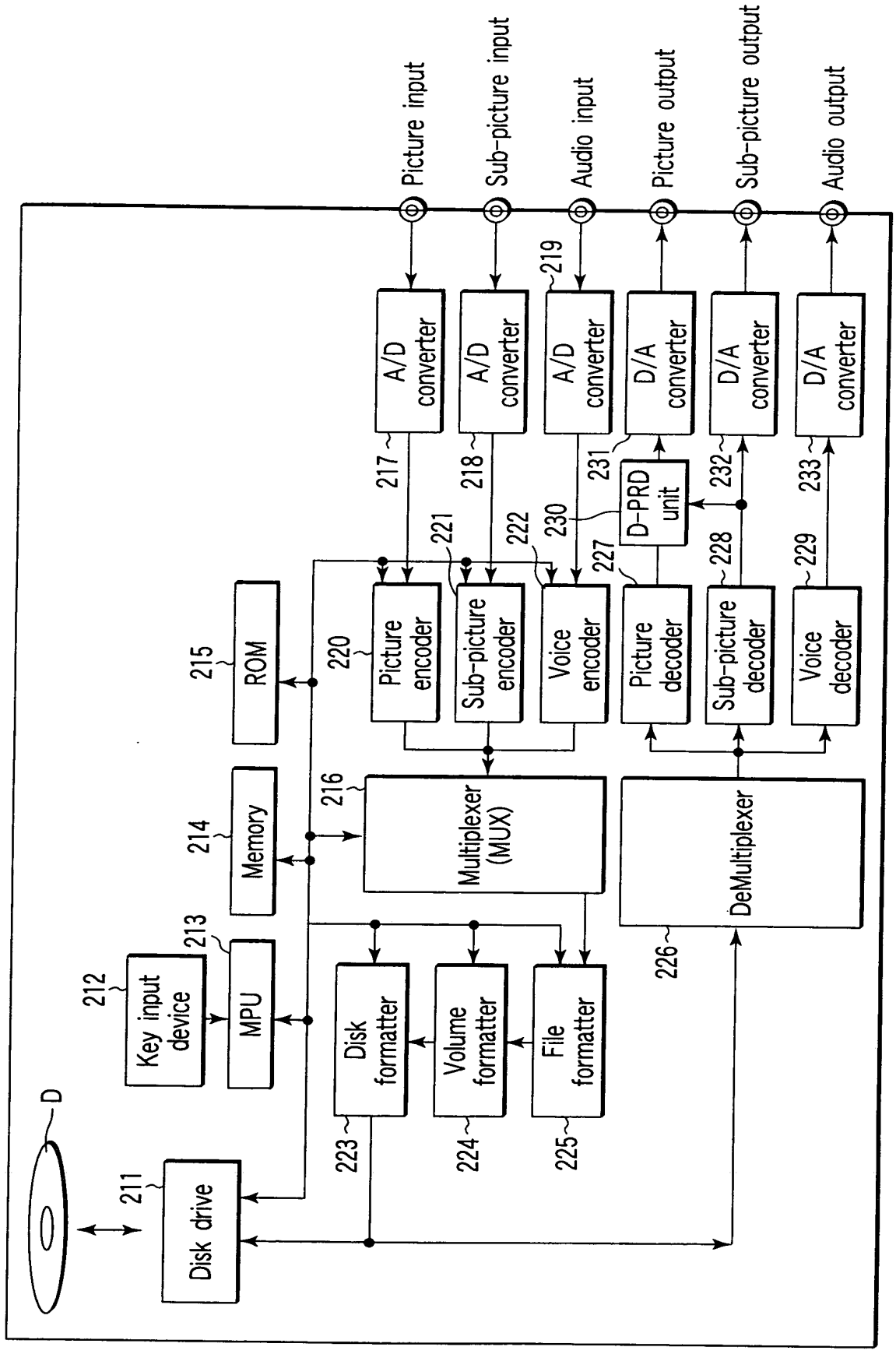

Picture input
Sub-picture input
Audio input
Picture output
Sub-picture output
Audio output
A/D converter
A/D converter
A/D converter
D/A converter
D/A converter
D/A converter
217
218
219
231
232
233
D-PRD unit
230
221
222
227
228
229
ROM
215
220
Picture encoder
Sub-picture encoder
Voice encoder
Picture decoder
Sub-picture decoder
Voice decoder
Memory
214
216
Multiplexer (MUX)
DeMultiplexer
226
213
MPU
212
Key input device
Disk formatter
Volume formatter
File formatter
223
224
225
D
211
Disk drive

FIG. 111

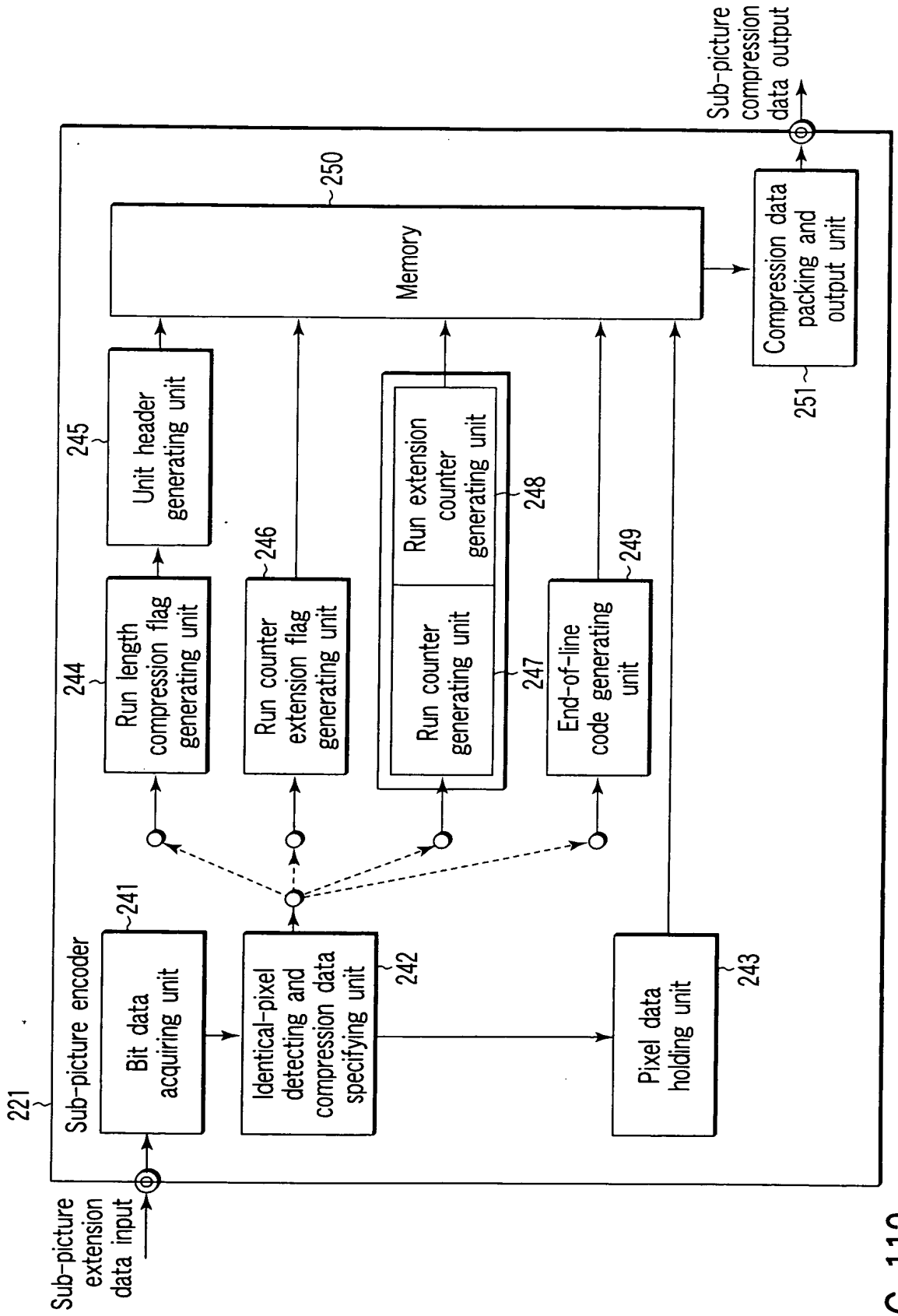

Sub-picture extension data input
221
Sub-picture encoder
241
Bit data acquiring unit
242
Identical-pixel detecting and compression data specifying unit
243
Pixel data holding unit
244
Run length compression flag generating unit
245
Unit header generating unit
246
Run counter extension flag generating unit
247
Run counter generating unit
248
Run extension counter generating unit
249
End-of-line code generating unit
250
Memory
251
Compression data packing and output unit
Sub-picture compression data output

FIG. 112

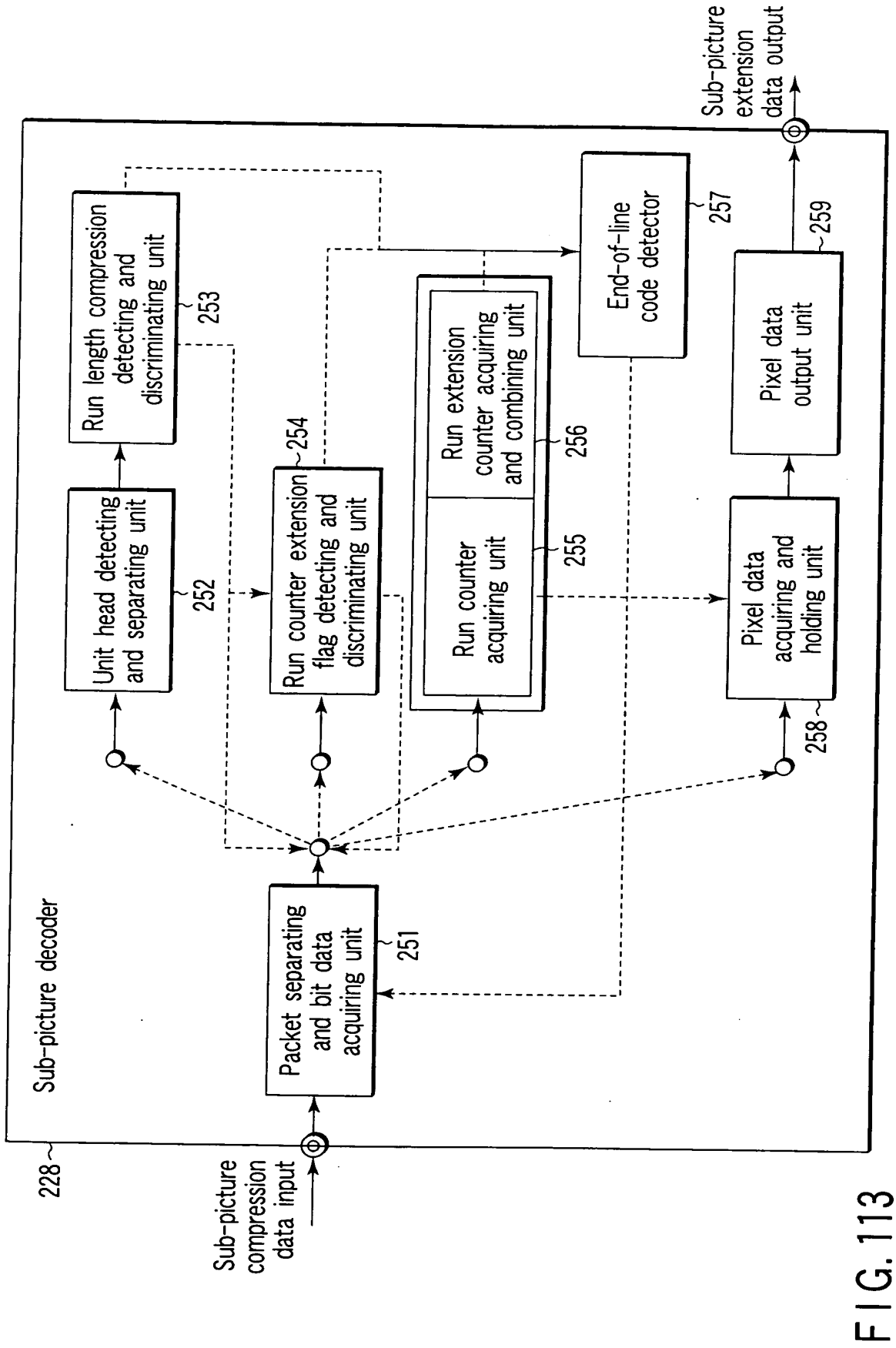

Sub-picture compression data input
228
Sub-picture decoder
Packet separating and bit data acquiring unit
251
Unit head detecting and separating unit
252
Run length compression detecting and discriminating unit
253
Run counter extension flag detecting and discriminating unit
254
Run counter acquiring unit
255
Run extension counter acquiring and combining unit
256
End-of-line code detector
257
Pixel data acquiring and holding unit
258
Pixel data output unit
259
Sub-picture extension data output

FIG. 113

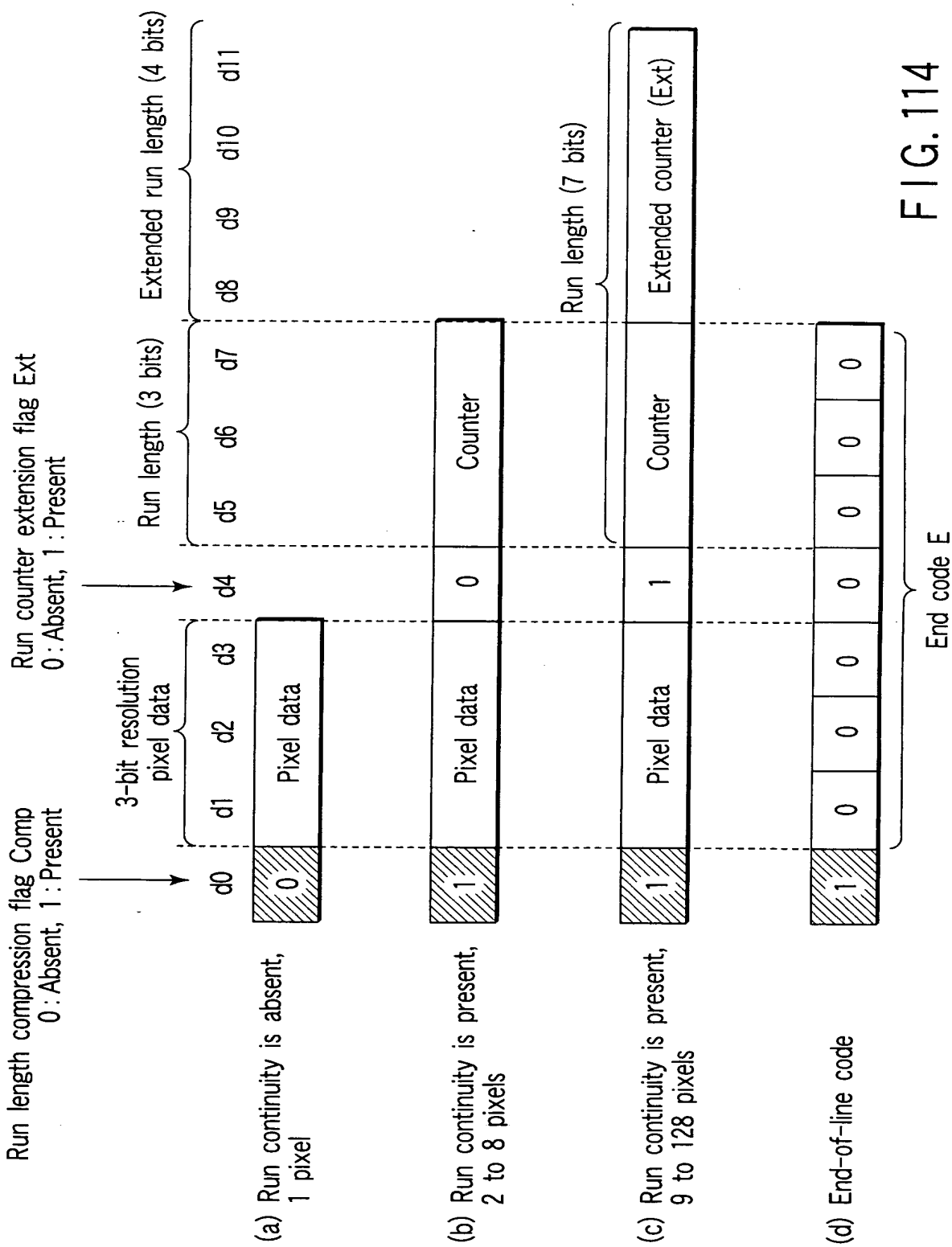

Run length compression flag Comp
0 : Absent, 1 : Present
Run counter extension flag Ext
0 : Absent, 1 : Present
3-bit resolution pixel data
Run length (3 bits)
Extended run length (4 bits)
d0 d1 d2 d3 d4 d5 d6 d7 d8 d9 d10 d11
Pixel data
Counter
Extended counter (Ext)
Run length (7 bits)
End code E
(a) Run continuity is absent, 1 pixel
(b) Run continuity is present, 2 to 8 pixels
(c) Run continuity is present, 9 to 128 pixels
(d) End-of-line code

FIG. 114

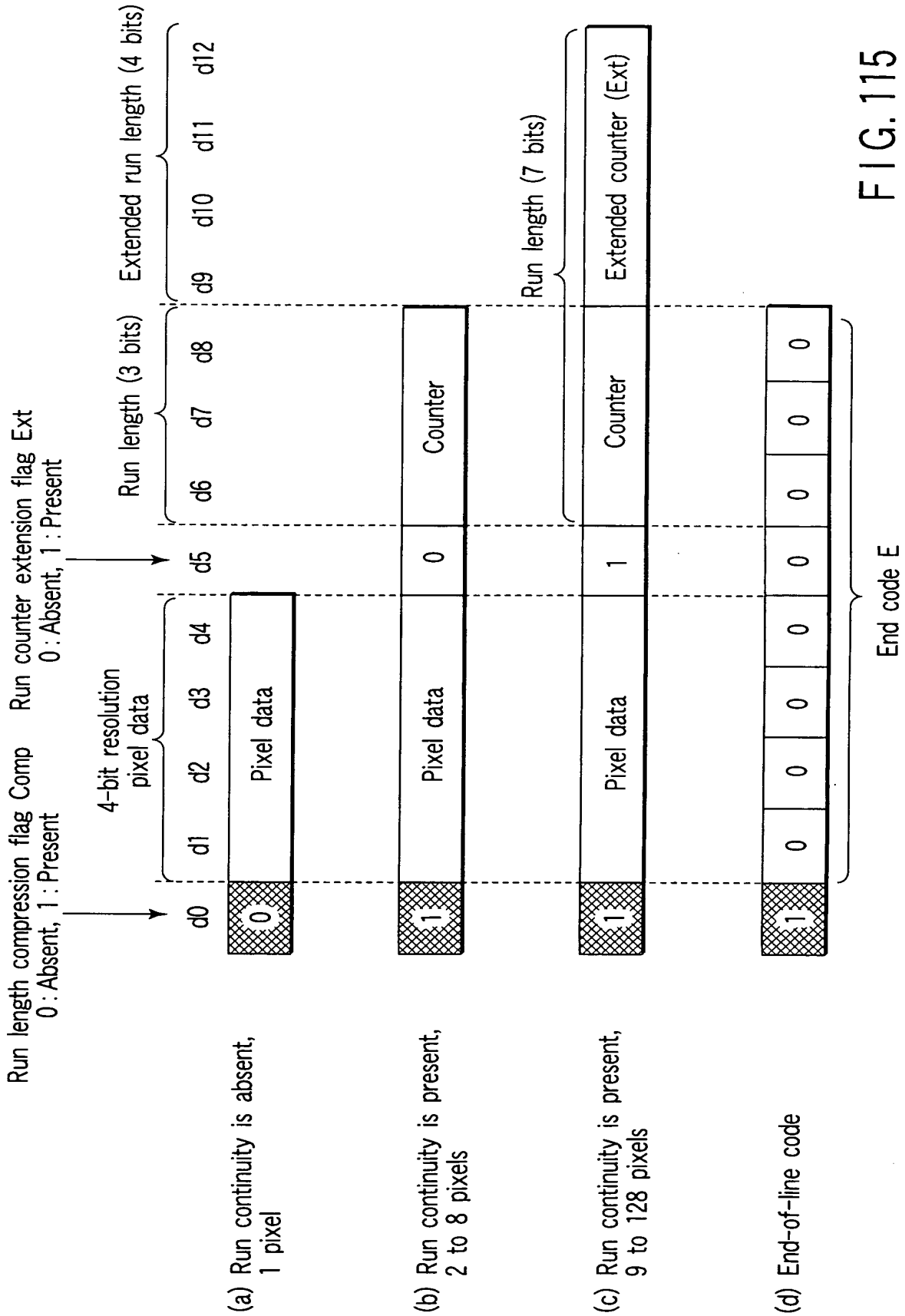

Run length compression flag Comp
0 : Absent, 1 : Present
Run counter extension flag Ext
0 : Absent, 1 : Present
4-bit resolution pixel data
Run length (3 bits)
Extended run length (4 bits)
Run length (7 bits)
d0 d1 d2 d3 d4 d5 d6 d7 d8 d9 d10 d11 d12
Pixel data
Counter
Extended counter (Ext)
End code E
(a) Run continuity is absent, 1 pixel
(b) Run continuity is present, 2 to 8 pixels
(c) Run continuity is present, 9 to 128 pixels
(d) End-of-line code

FIG. 115

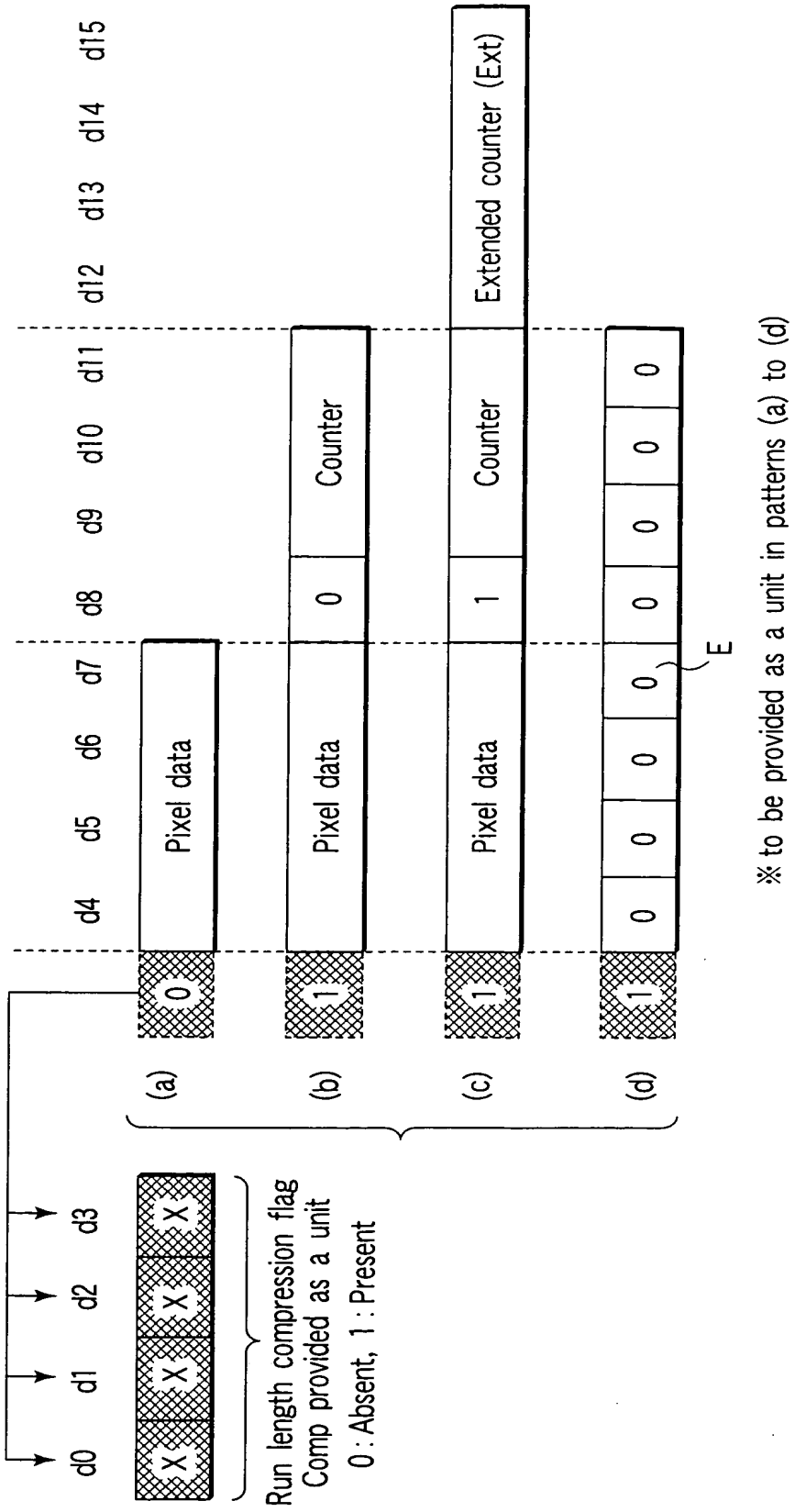

d0 d1 d2 d3 d4 d5 d6 d7 d8 d9 d10 d11 d12 d13 d14 d15
X X X X
Run length compression flag
Comp provided as a unit
0 : Absent, 1 : Present
(a) 0 Pixel data
(b) 1 Pixel data 0 Counter
(c) 1 Pixel data 1 Counter Extended counter (Ext)
(d) 1 Pixel data 0 0 0 0 0 0 0 0 0 0 0 E
※ to be provided as a unit in patterns (a) to (d)

FIG. 116

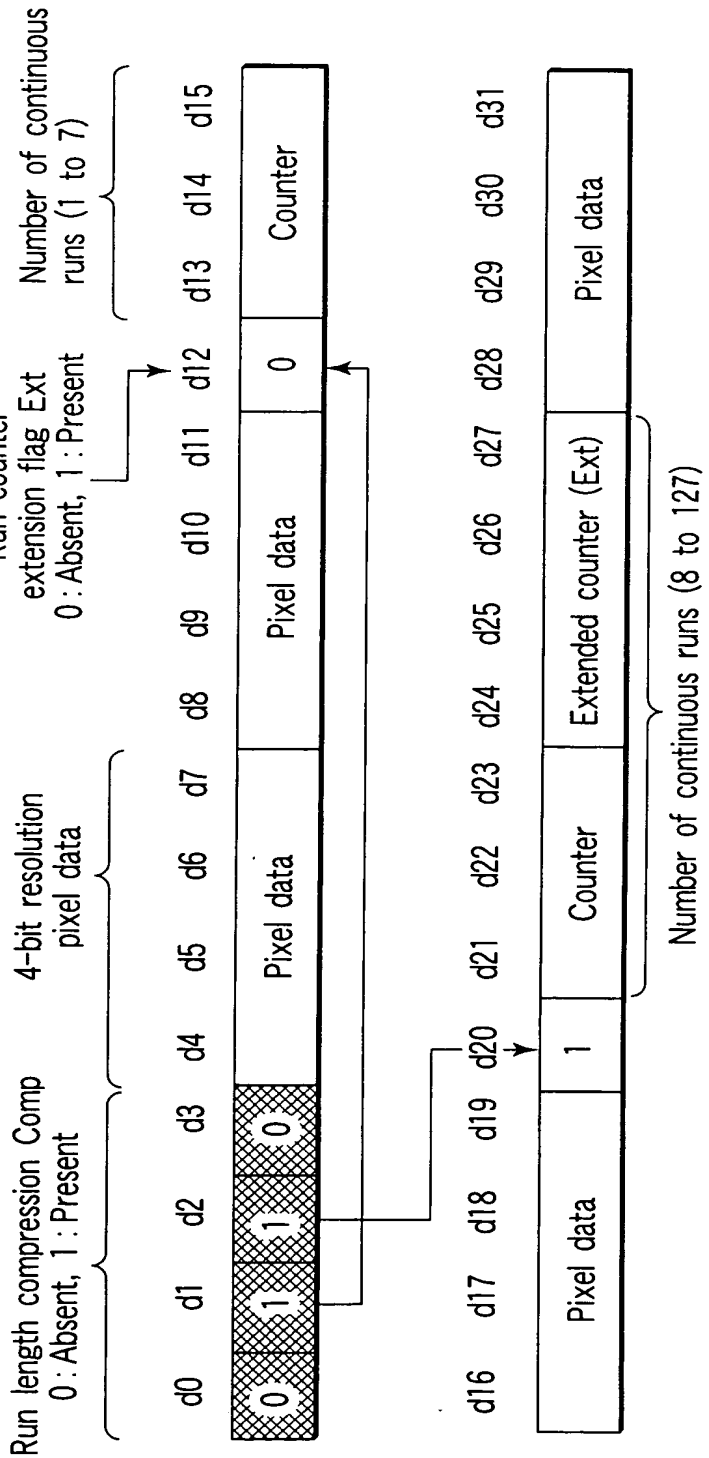

Run length compression Comp
0 : Absent, 1 : Present
4-bit resolution
pixel data
Run counter
extension flag Ext
0 : Absent, 1 : Present
Number of continuous
runs (1 to 7)
d0 d1 d2 d3 d4 d5 d6 d7 d8 d9 d10 d11 d12 d13 d14 d15
0 1 1 1 0
Pixel data
Pixel data
0
Counter
d16 d17 d18 d19 d20 d21 d22 d23 d24 d25 d26 d27 d28 d29 d30 d31
Pixel data
1
Counter
Extended counter (Ext)
Pixel data
Number of continuous runs (8 to 127)

FIG. 117

FIG. 118A

In case of all non-compressions (shortest pattern) : 4-pixel expression

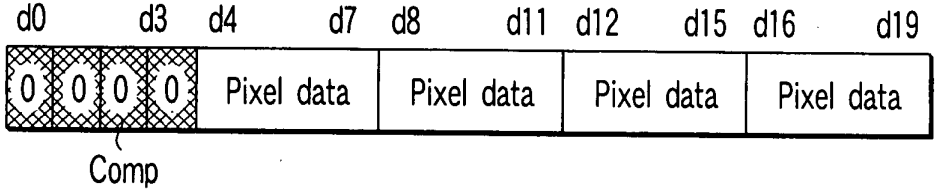


FIG. 118B

In case where compression of 8 or less run continuities is provided : Expression of (8 + 3) pixels or less

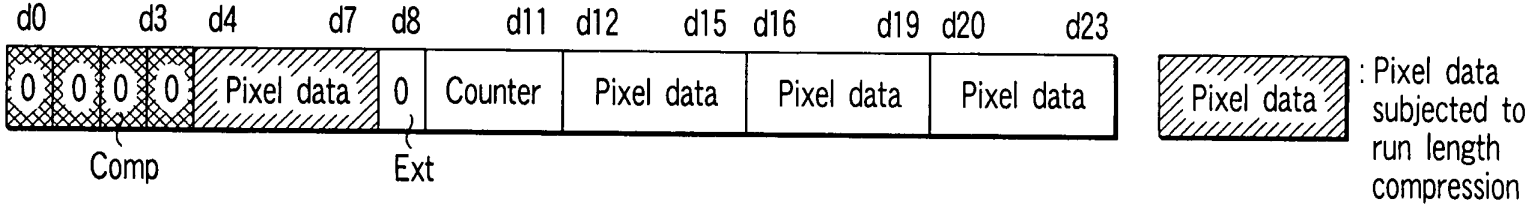


FIG. 118C

In case where compression of 9 to 128 run continuities is provided : Expression of (128 + 3) pixels or less

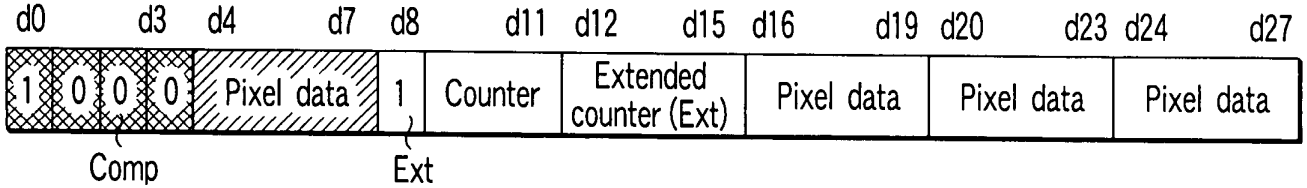
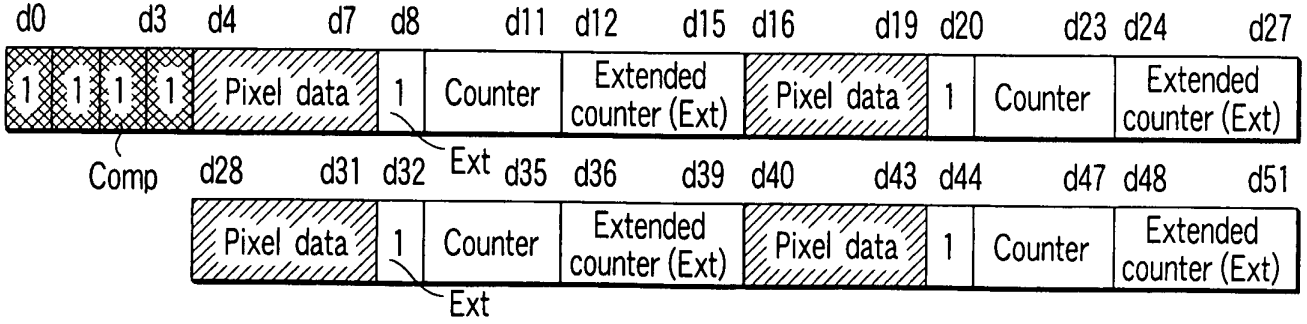


FIG. 118D

In case of all compressions (longest pattern) : Expression of (128 + 128 + 128 + 128) pixels or less



In case of only end code

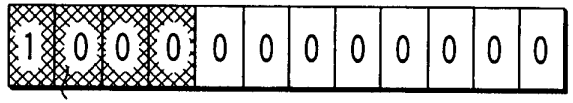


FIG. 119A

In case of the end at 1-pixel

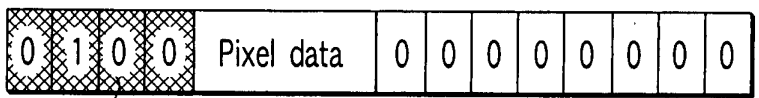


FIG. 119B

In case of the end at 2-pixel

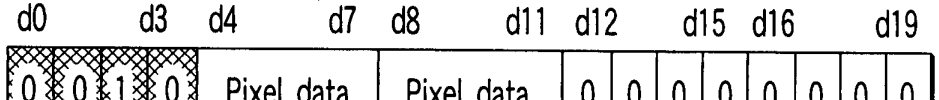


FIG. 119C

In case of the end at run continuity of 2 to 8 pixels

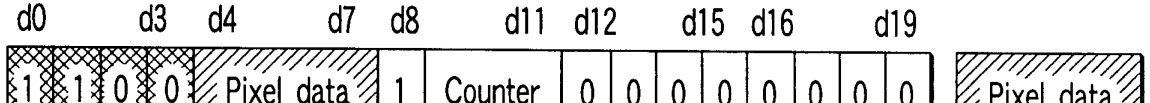


FIG. 119D

In case of the end at run continuity of 128 pixels or less

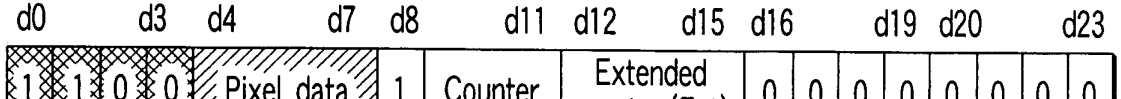


FIG. 119E

In case where background of one line is produced by pixel of one type

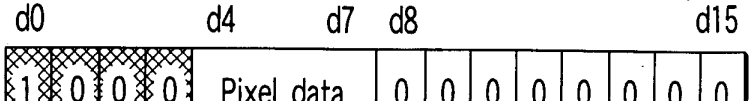


FIG. 119F

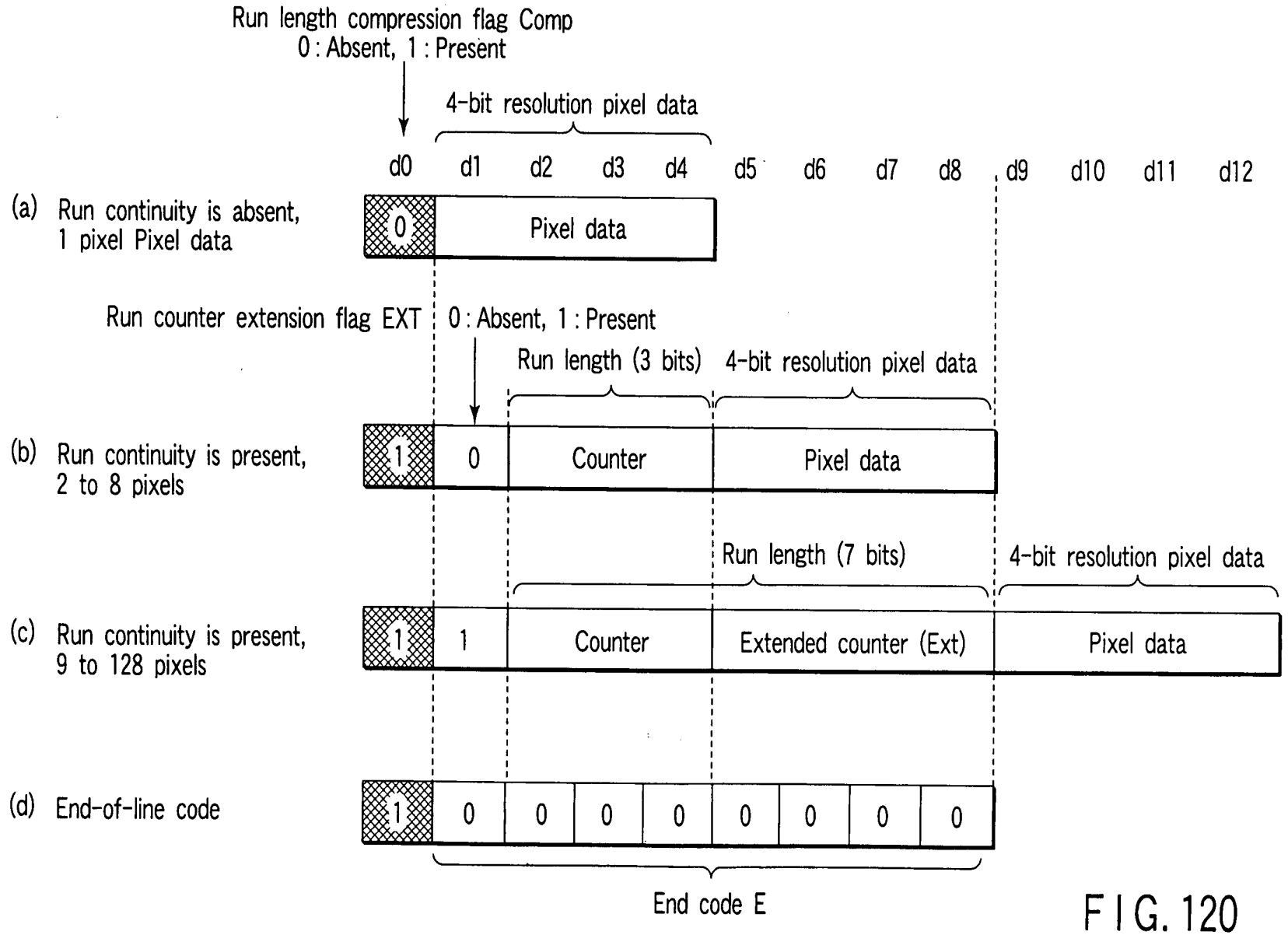


FIG. 120

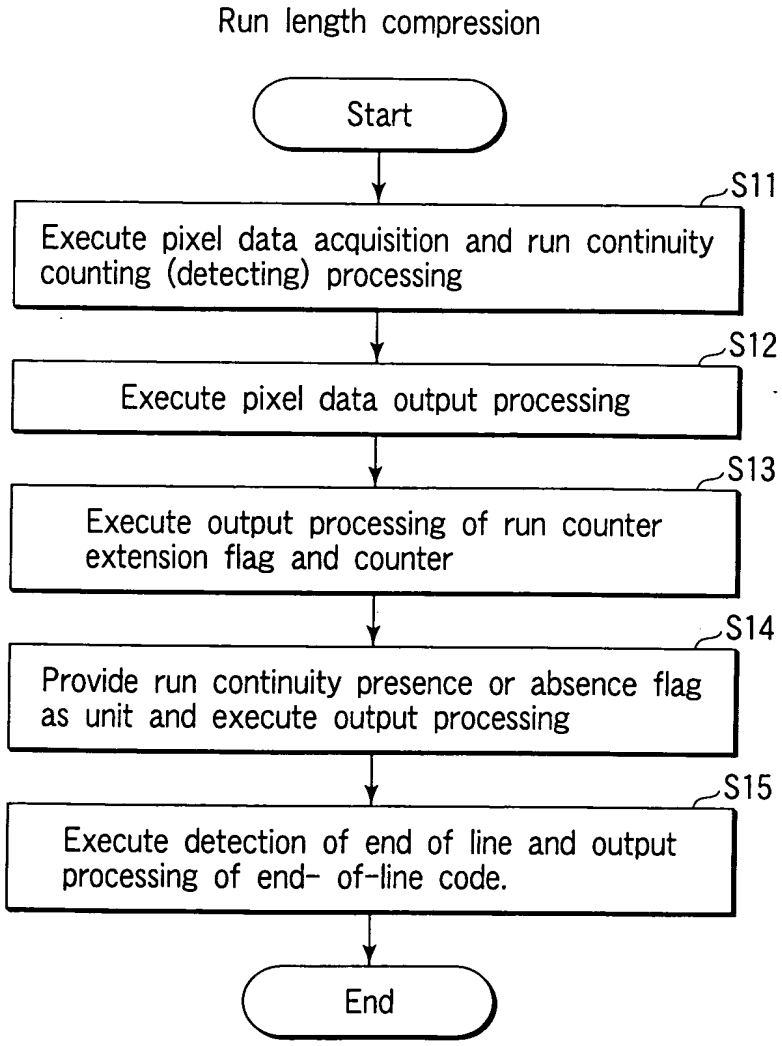

Run length compression
Start
S11
Execute pixel data acquisition and run continuity counting (detecting) processing
S12
Execute pixel data output processing
S13
Execute output processing of run counter extension flag and counter
S14
Provide run continuity presence or absence flag as unit and execute output processing
S15
Execute detection of end of line and output processing of end- of-line code.
End

FIG. 121

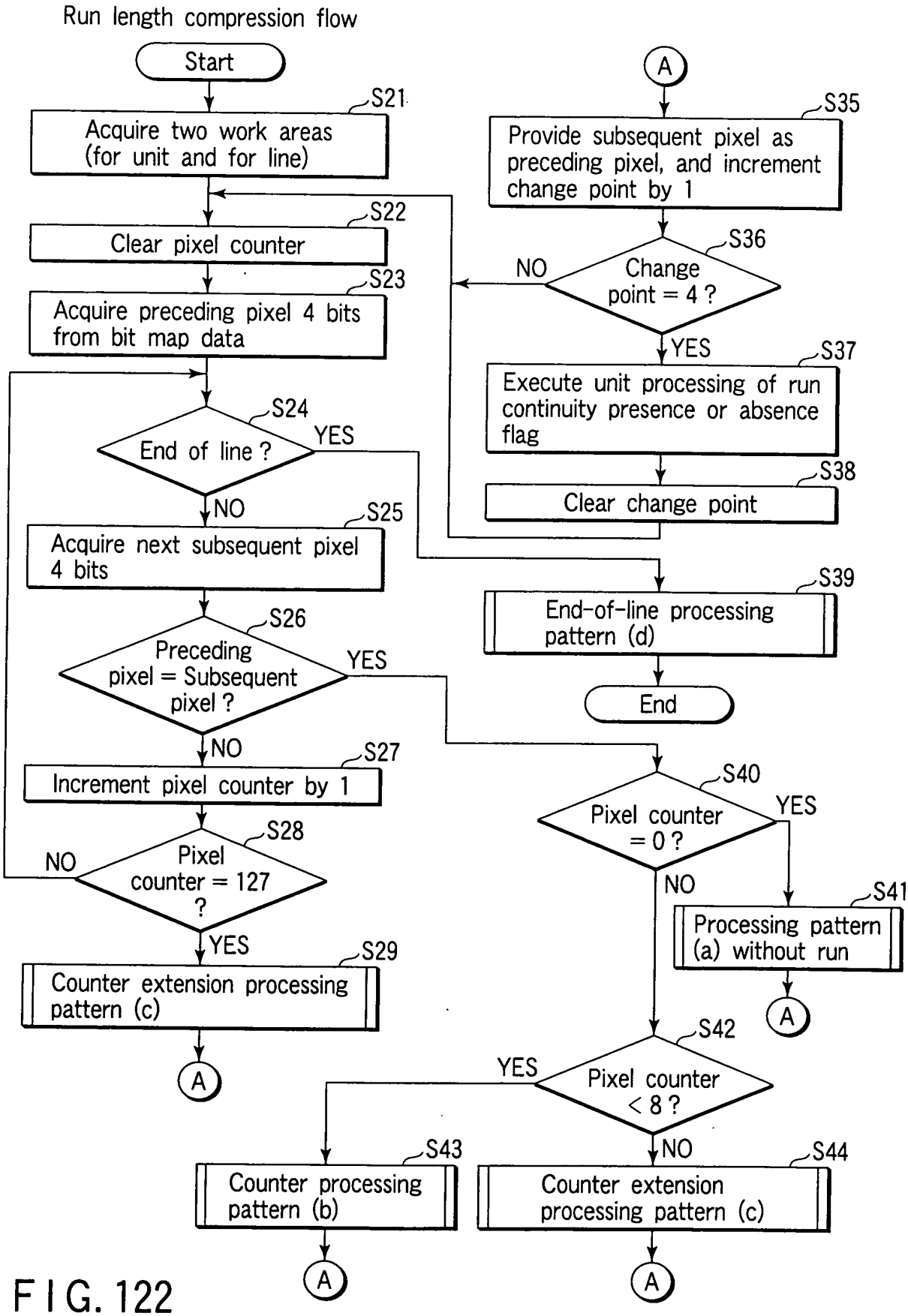

Run length compression flow
Start
S21
Acquire two work areas (for unit and for line)
S22
Clear pixel counter
S23
Acquire preceding pixel 4 bits from bit map data
S24
End of line ?
YES
NO
S25
Acquire next subsequent pixel 4 bits
S26
Preceding pixel = Subsequent pixel ?
YES
NO
S27
Increment pixel counter by 1
S28
Pixel counter = 127 ?
NO
YES
S29
Counter extension processing pattern (c)
A
A
S35
Provide subsequent pixel as preceding pixel, and increment change point by 1
S36
Change point = 4 ?
NO
YES
S37
Execute unit processing of run continuity presence or absence flag
S38
Clear change point
S39
End-of-line processing pattern (d)
End
S40
Pixel counter = 0 ?
YES
NO
S41
Processing pattern (a) without run
A
S42
Pixel counter < 8 ?
YES
NO
S43
Counter processing pattern (b)
S44
Counter extension processing pattern (c)
A
A

FIG. 122

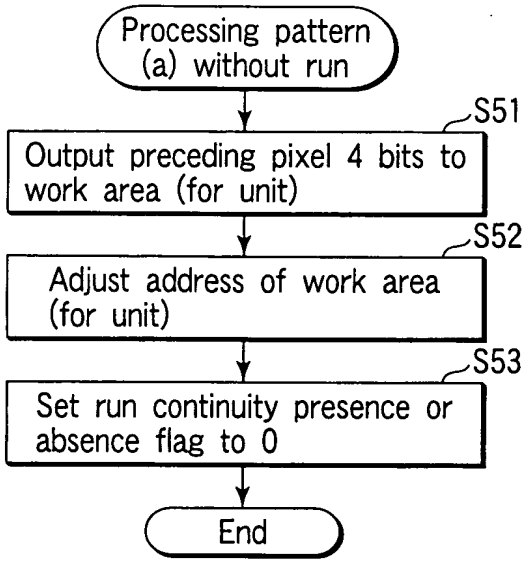


FIG. 123A

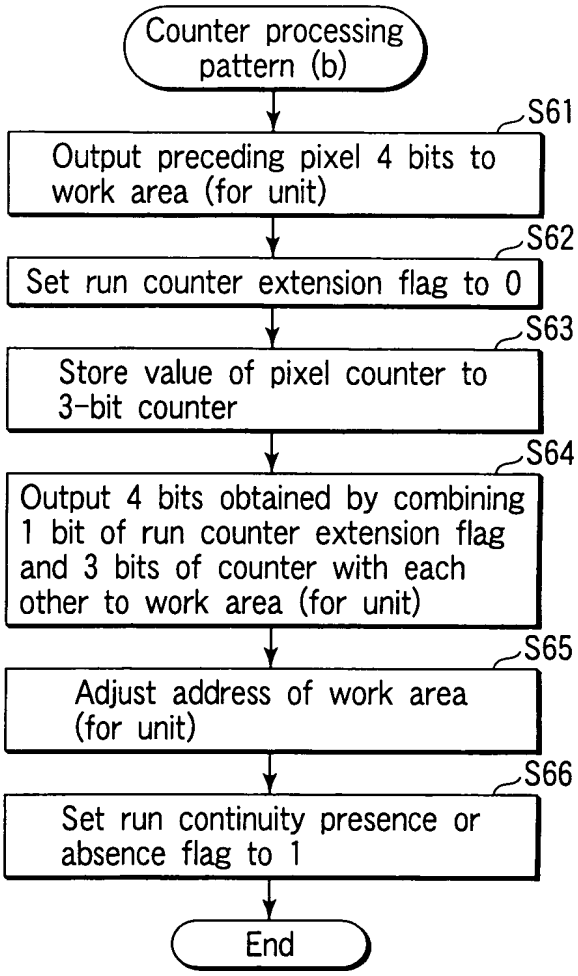


FIG. 123B

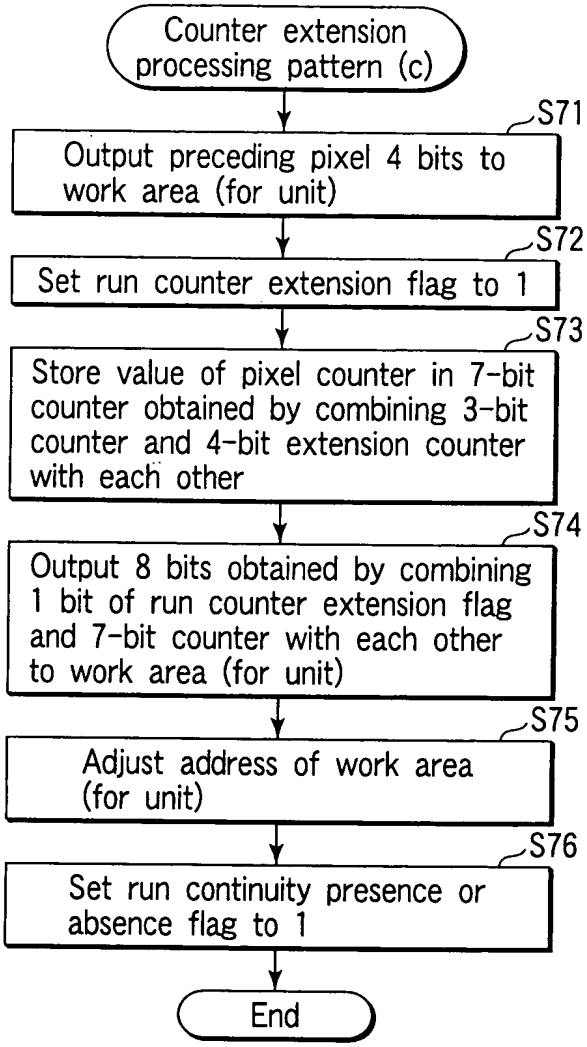


FIG. 124A

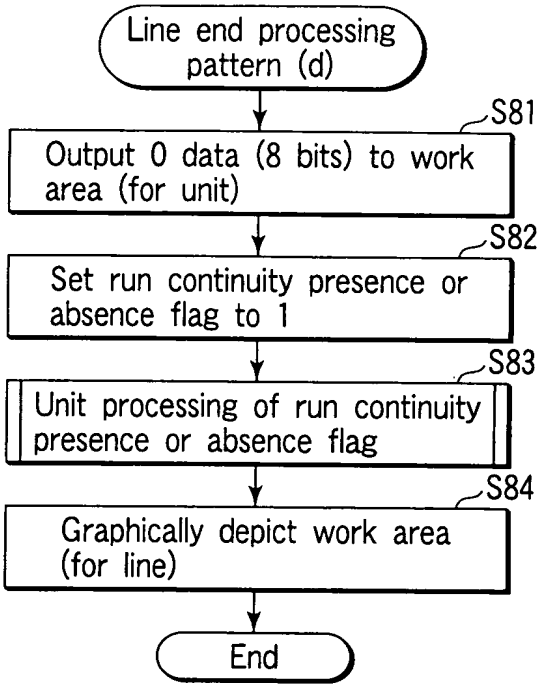


FIG. 124B

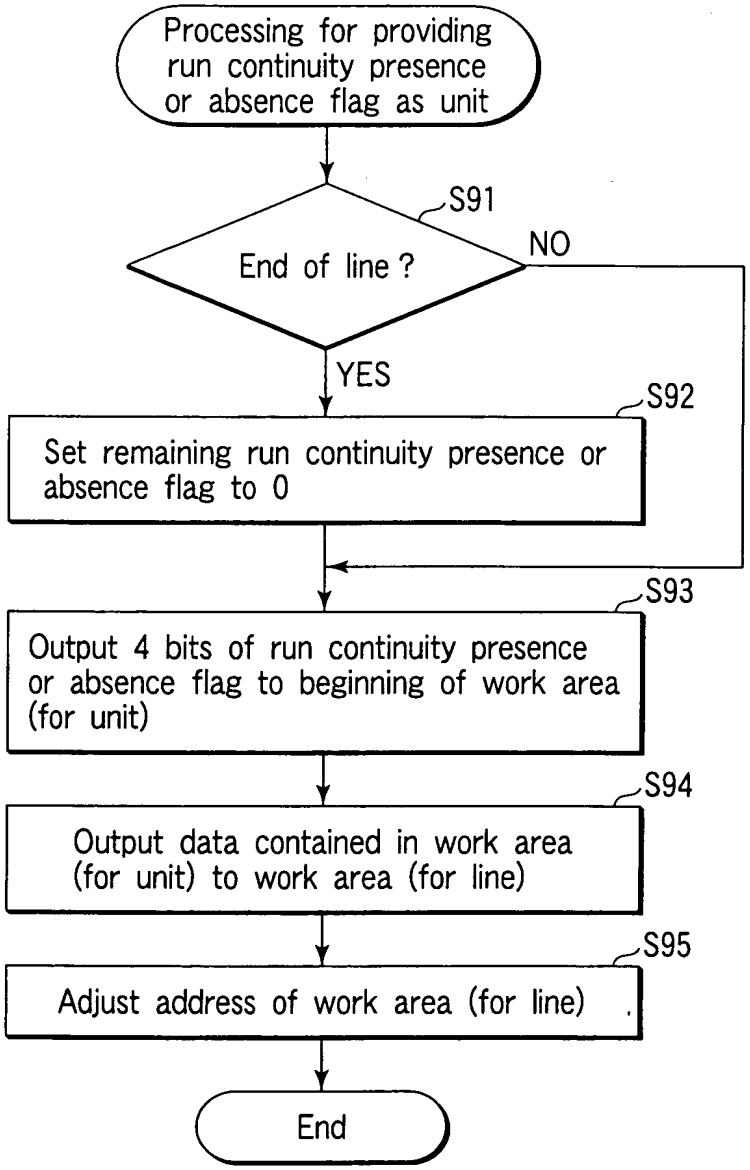

Processing for providing run continuity presence or absence flag as unit
S91
End of line ?
NO
YES
S92
Set remaining run continuity presence or absence flag to 0
S93
Output 4 bits of run continuity presence or absence flag to beginning of work area (for unit)
S94
Output data contained in work area (for unit) to work area (for line)
S95
Adjust address of work area (for line)
End

FIG. 125

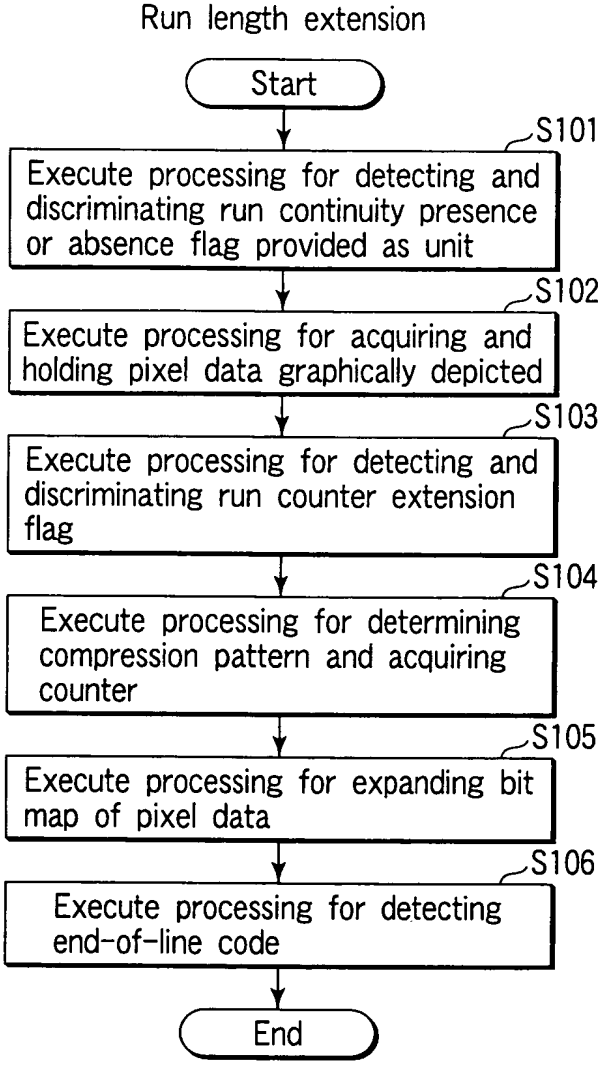


FIG. 126

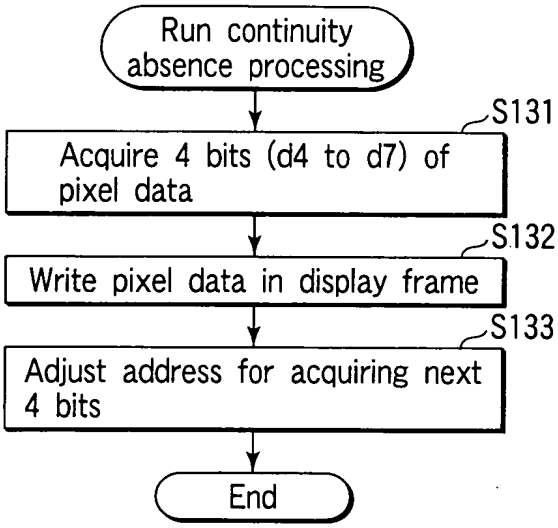


FIG. 128

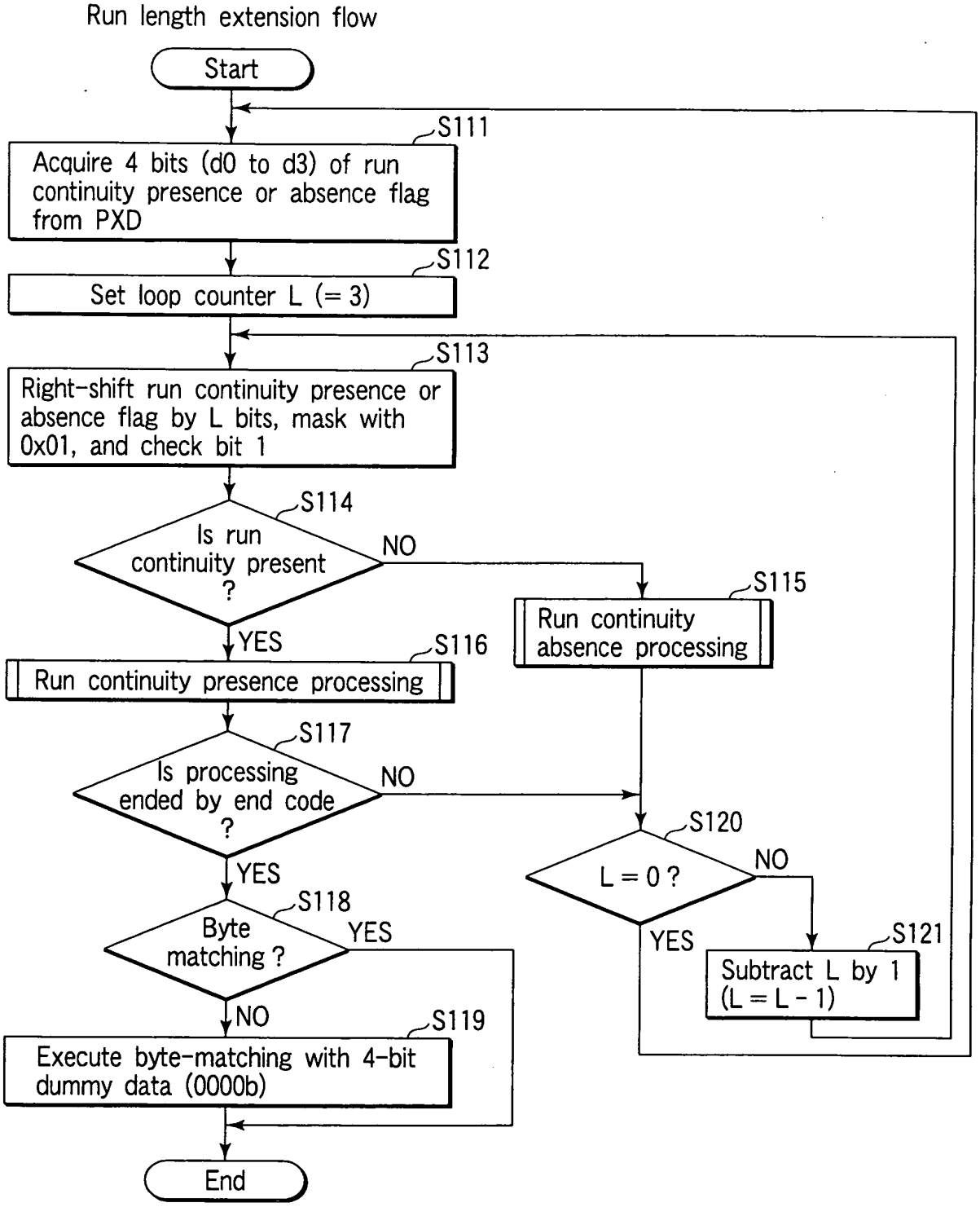

Run length extension flow
Start
S111
Acquire 4 bits (d0 to d3) of run continuity presence or absence flag from PXD
S112
Set loop counter L (= 3)
S113
Right-shift run continuity presence or absence flag by L bits, mask with 0x01, and check bit 1
S114
Is run continuity present ?
NO
YES
S115
Run continuity absence processing
S116
Run continuity presence processing
S117
Is processing ended by end code ?
NO
YES
S118
Byte matching ?
YES
NO
S119
Execute byte-matching with 4-bit dummy data (0000b)
S120
L = 0 ?
NO
YES
S121
Subtract L by 1 (L = L - 1)
End

FIG. 127

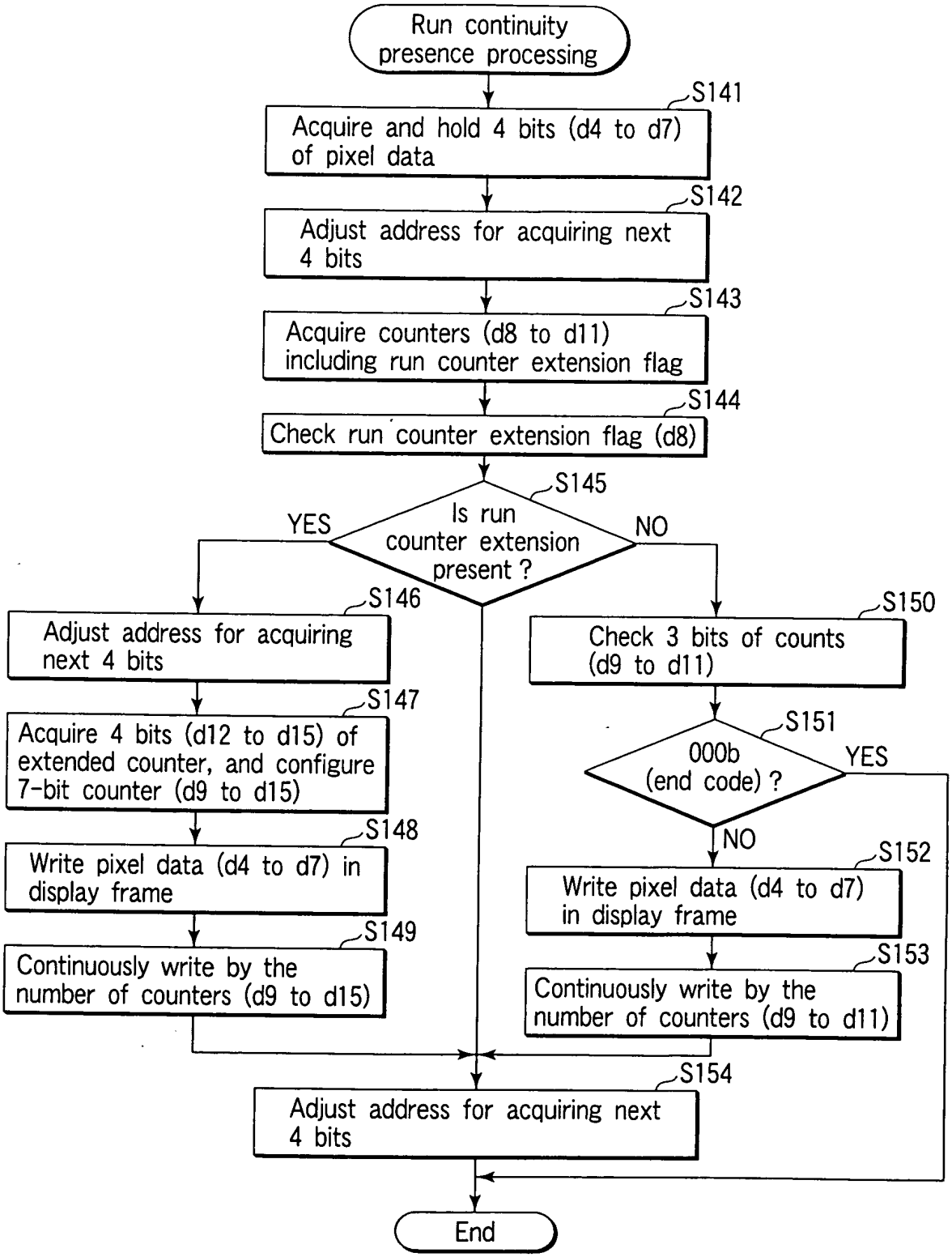

Run continuity presence processing
S141
Acquire and hold 4 bits (d4 to d7) of pixel data
S142
Adjust address for acquiring next 4 bits
S143
Acquire counters (d8 to d11) including run counter extension flag
S144
Check run counter extension flag (d8)
S145
Is run counter extension present ?
YES
NO
S146
Adjust address for acquiring next 4 bits
S147
Acquire 4 bits (d12 to d15) of extended counter, and configure 7-bit counter (d9 to d15)
S148
Write pixel data (d4 to d7) in display frame
S149
Continuously write by the number of counters (d9 to d15)
S150
Check 3 bits of counts (d9 to d11)
S151
000b (end code) ?
YES
NO
S152
Write pixel data (d4 to d7) in display frame
S153
Continuously write by the number of counters (d9 to d11)
S154
Adjust address for acquiring next 4 bits
End

FIG. 129

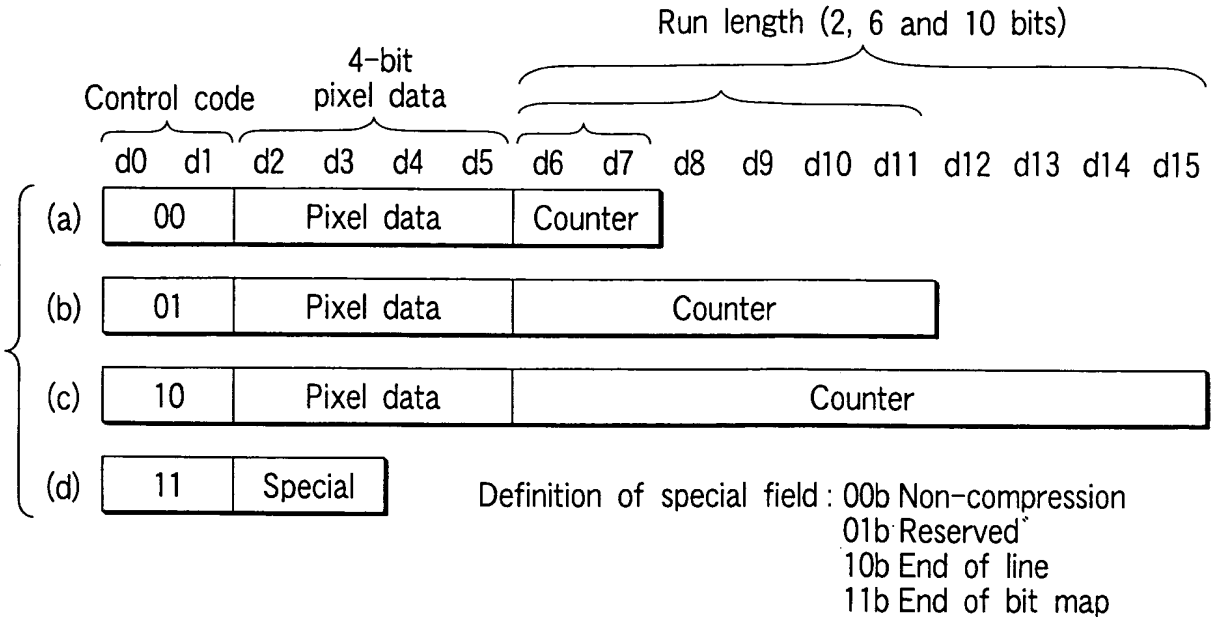


FIG. 130

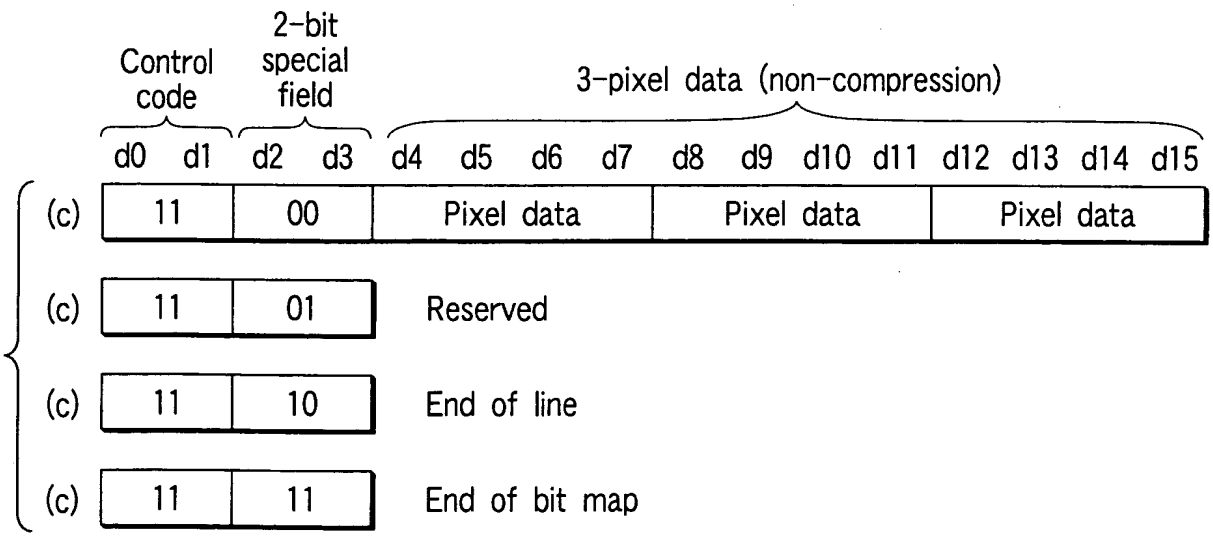


FIG. 131

Example of run length compression per unit

PXD before compression (bit map data)

P0	P1	P2	P3	P4	···	P10	P11	P12	P13	···	P137	P138
0001	0010	0010	0011	0011	···	0011	0100	0100	0100	···	0100	0100

PXD after compression

0111	0001	0010 0001	0011 0111	0100 1111 1111
(Unit header)	(P0)	(P1 to P2)	(P3 to P10)	(P11 to P138)

FIG. 132

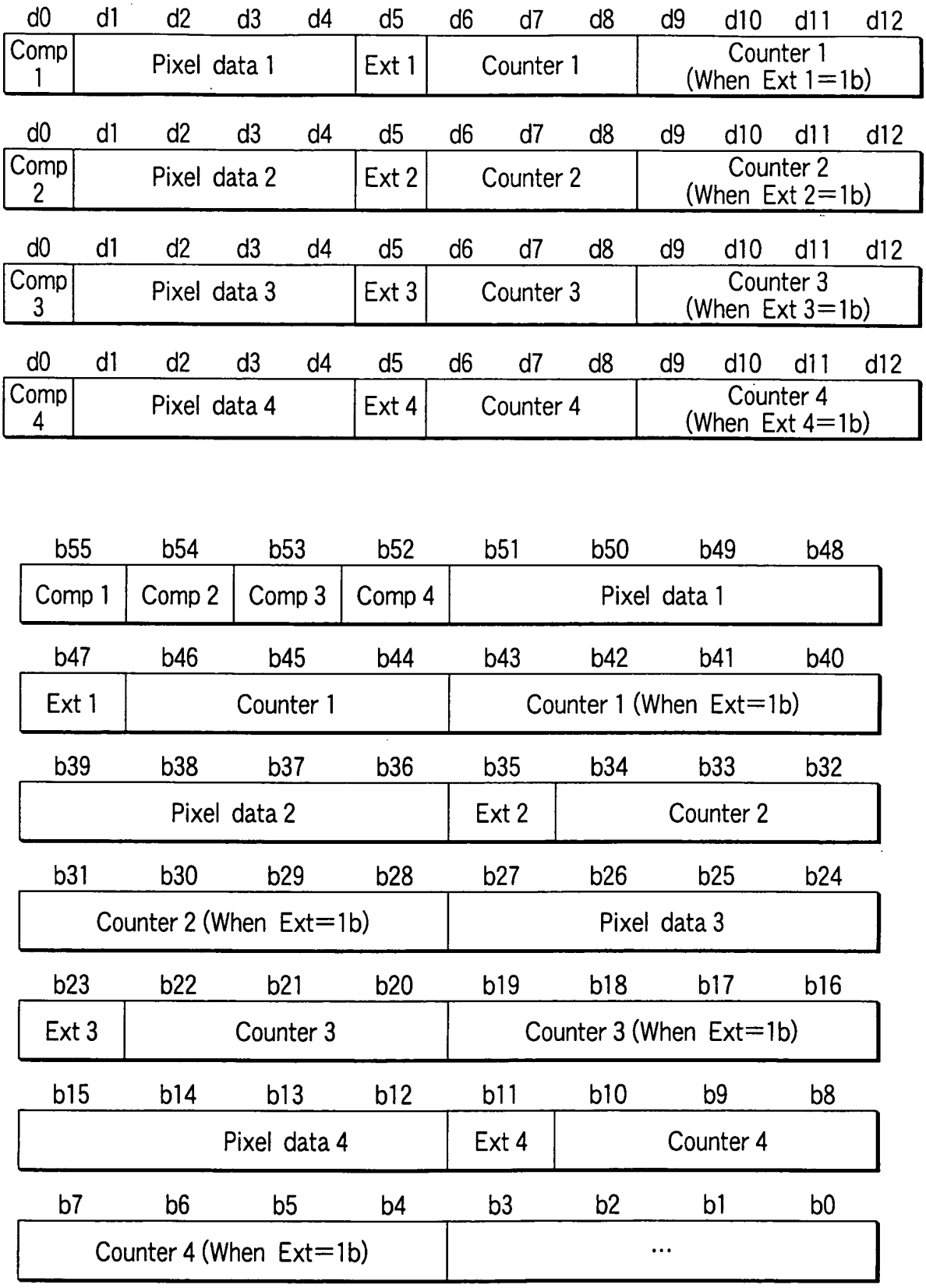

d0 d1 d2 d3 d4 d5 d6 d7 d8 d9 d10 d11 d12
Comp 1
Pixel data 1
Ext 1
Counter 1
Counter 1 (When Ext 1=1b)
d0 d1 d2 d3 d4 d5 d6 d7 d8 d9 d10 d11 d12
Comp 2
Pixel data 2
Ext 2
Counter 2
Counter 2 (When Ext 2=1b)
d0 d1 d2 d3 d4 d5 d6 d7 d8 d9 d10 d11 d12
Comp 3
Pixel data 3
Ext 3
Counter 3
Counter 3 (When Ext 3=1b)
d0 d1 d2 d3 d4 d5 d6 d7 d8 d9 d10 d11 d12
Comp 4
Pixel data 4
Ext 4
Counter 4
Counter 4 (When Ext 4=1b)
b55 b54 b53 b52 b51 b50 b49 b48
Comp 1
Comp 2
Comp 3
Comp 4
Pixel data 1
b47 b46 b45 b44 b43 b42 b41 b40
Ext 1
Counter 1
Counter 1 (When Ext=1b)
b39 b38 b37 b36 b35 b34 b33 b32
Pixel data 2
Ext 2
Counter 2
b31 b30 b29 b28 b27 b26 b25 b24
Counter 2 (When Ext=1b)
Pixel data 3
b23 b22 b21 b20 b19 b18 b17 b16
Ext 3
Counter 3
Counter 3 (When Ext=1b)
b15 b14 b13 b12 b11 b10 b9 b8
Pixel data 4
Ext 4
Counter 4
b7 b6 b5 b4 b3 b2 b1 b0
Counter 4 (When Ext=1b)
...

FIG. 133

Display control sequence table (SP_DDCSQT) Description order

	Contents
SP_DCSQ #0	Display control sequence #0
SP_DCSQ #1	Display control sequence #1
:	
:	
SP_DCSQ #n	Display control sequence #n

FIG. 134

Display control sequence (SP_DCSQ) Description order

	Contents	Number of bytes
(1)SP_DCSQ_STM	Start time of SP_DCSQ	2 bytes
(2)SP_NXT_DCSQ_SA	Start address of next SP_DCSQ	4 bytes
(3)SP_DCCMD #1	Display control command #1	
:	:	
SP_DCCMD #n	Display control command #n	

FIG. 135

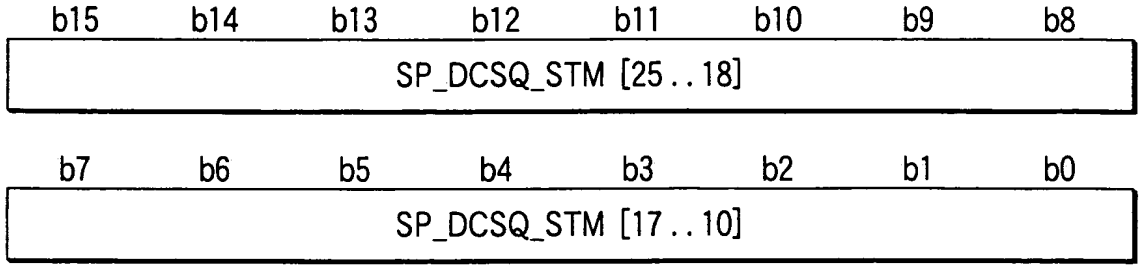


FIG. 136

Display control command (SP_DCCMD)

Command name	Contents	Codes	Number of extended fields
(1)FSTA_DSP	Forcibly set pixel data display start timing	00h	0 bytes
(2)STA_DSP	Set pixel data display start timing	01h	0 bytes
(3)STP_DSP	Set pixel data display stop timing	02h	0 bytes
(4)SET_COLOR	Set color code of pixel data	03h	8 bytes
(5)SET_CONTR	Set contrast between pixel data and main picture	04h	8 bytes
(6)SET_DAREA	Set pixel data display region	05h	6 bytes
(7)SET_DSPXA	Set pixel data display start address	06h	8 bytes
(8)CHG_COLCON	Set change of pixel data color and contrast	07h	PCD size + 2 bytes
(9)CMD_END	End display control command	FFh	0 bytes

FIG. 137

FSTA_DSP

b7	b6	b5	b4	b3	b2	b1	b0
0	0	0	0	0	0	0	0

FIG. 138A

STA_DSP

b7	b6	b5	b4	b3	b2	b1	b0
0	0	0	0	0	0	0	1

FIG. 138B

STP_DSP

b7	b6	b5	b4	b3	b2	b1	b0
0	0	0	0	0	0	1	0

FIG. 138C

SET_COLOR

b71	b70	b69	b68	b67	b66	b65	b64
0	0	0	0	0	0	1	1

b63	b62	b61	b60	b59	b58	b57	b56
Color code of pixel 16				Color code of pixel 15			

b55	b54	b53	b52	b51	b50	b49	b48
Color code of pixel 14				Color code of pixel 13			

b47	b46	b45	b44	b43	b42	b41	b40
Color code of pixel 12				Color code of pixel 11			

b39	b38	b37	b36	b35	b34	b33	b32
Color code of pixel 10				Color code of pixel 9			

b31	b30	b29	b28	b27	b26	b25	b24
Color code of pixel 8				Color code of pixel 7			

b23	b22	b21	b20	b19	b18	b17	b16
Color code of pixel 6				Color code of pixel 5			

b15	b14	b13	b12	b11	b10	b9	b8
Color code of pixel 4				Color code of pixel 3			

b7	b6	b5	b4	b3	b2	b1	b0
Color code of pixel 2				Color code of pixel 1			

FIG. 139

SET_CONTR

b71	b70	b69	b68	b67	b66	b65	b64
0	0	0	0	0	1	0	0

b63	b62	b61	b60	b59	b58	b57	b56
Contrast of pixel 16				Contrast of pixel 15			

b55	b54	b53	b52	b51	b50	b49	b48
Contrast of pixel 14				Contrast of pixel 13			

b47	b46	b45	b44	b43	b42	b41	b40
Contrast of pixel 12				Contrast of pixel 11			

b39	b38	b37	b36	b35	b34	b33	b32
Contrast of pixel 10				Contrast of pixel 9			

b31	b30	b29	b28	b27	b26	b25	b24
Contrast of pixel 8				Contrast of pixel 7			

b23	b22	b21	b20	b19	b18	b17	b16
Contrast of pixel 6				Contrast of pixel 5			

b15	b14	b13	b12	b11	b10	b9	b8
Contrast of pixel 4				Contrast of pixel 3			

b7	b6	b5	b4	b3	b2	b1	b0
Contrast of pixel 2				Contrast of pixel 1			

FIG. 140

SET_DAREA

b55	b54	b53	b52	b51	b50	b49	b48
0	0	0	0	0	1	0	1

b47	b46	b45	b44	b43	b42	b41	b40
reserved		Start X-coordinate (Upper bits)					

b39	b38	b37	b36	b35	b34	b33	b32
Start X-coordinate (Lower bits)					End X-coordinate (Upper bits)		

b31	b30	b29	b28	b27	b26	b25	b24
End X-coordinate (Lower bits)							

b23	b22	b21	b20	b19	b18	b17	b16
reserved		Start Y-coordinate (Upper bits)					

b15	b14	b13	b12	b11	b10	b9	b8
Start Y-coordinate (Lower bits)				0	End Y-coordinate (Upper bits)		

b7	b6	b5	b4	b3	b2	b1	b0
End Y-coordinate (Lower bits)							

FIG. 141

	TV system				
	525/60	625/50	HDTV-1280	HDTV-1440	HDTV-1920
X-coordinate value	0~719	0~719	0~1279	0~1439	0~1919
Y-coordinate value	2~479	2~574	2~719	2~1079	2~1079

FIG. 142

SET_DSPXA

b71	b70	b69	b68	b67	b66	b65	b64
0	0	0	0	0	1	1	0

b63	b62	b61	b60	b59	b58	b57	b56
Address of start pixel data for top field and/or address of plain data (Upper bits)							

b55	b54	b53	b52	b51	b50	b49	b48
Address of start pixel data for top field and/or address of plain data (Middle upper bits)							

b47	b46	b45	b44	b43	b42	b41	b40
Address of start pixel data for top field and/or address of plain data (Middle lower bits)							

b39	b38	b37	b36	b35	b34	b33	b32
Address of start pixel data for top field and/or address of plain data (Lower bits)							

b31	b30	b29	b28	b27	b26	b25	b24
Address of start pixel data for bottom field (Upper bits) and/or reserved							

b23	b22	b21	b20	b19	b18	b17	b16
Address of start pixel data for bottom field (Middle upper bits) and/or reserved							

b15	b14	b13	b12	b11	b10	b9	b8
Address of start pixel data for bottom field (Middle lower bits) and/or reserved							

b7	b6	b5	b4	b3	b2	b1	b0
Address of start pixel data for bottom field (Lower bits) and/or reserved							

FIG. 143

CHG_COLCON

bm	bm-1	bm-2	bm-3	bm-4	bm-5	bm-6	bm-7
0	0	0	0	0	1	1	1

bm-8	bm-9	bm-10	bm-11	bm-12	bm-13	bm-14	bm-15
reserved							

bm-16	bm-17	bm-18	bm-19	bm-20	bm-21	bm-22	bm-23
Extended field size (Upper bits)							

bm-24	bm-25	bm-26	bm-27	bm-28	bm-29	bm-30	bm-31
Extended field size (Middle bits)							

bm-32	bm-33	bm-34	bm-35	bm-36	bm-37	bm-38	bm-39
Extended field size (Lower bits)							

bm-40	bm-41	bm-42	bm-43	bm-44	bm-45	bm-46	bm-47
Pixel control data PXCD (start)							

b7	b6	b5	b4	b3	b2	b1	b0
Pixel control data PXCD (end)							

FIG. 144

CMD_END

b7	b6	b5	b4	b3	b2	b1	b0
1	1	1	1	1	1	1	1

FIG. 145

PXCD	Contents	Description order Number of bytes
LN_CTLI #1	Line control information #1	4 bytes
PX_CTLI #1	Pixel control information #1	18 bytes
:	:	:
PX_CTLI #i	Pixel control information #i	18 bytes
LN_CTLI #2	Line control information #2	4 bytes
PX_CTLI #1	Pixel control information #1	18 bytes
:	:	:
PX_CTLI #j	Pixel control information #j	18 bytes
⋮	⋮	⋮
LN_CTLI #n-1	Line control information #n-1	4 bytes
PX_CTLI #1	Pixel control information #1	18 bytes
:	:	:
PX_CTLI #k	Pixel control information #k	18 bytes
LN_CTLI #n	Line control information #n (end code)	4 bytes

FIG. 146

LN_CTLI

b31	b30	b29	b28	b27	b26	b25	b24
reserved					Start-of-change line number (Upper bits)		

b23	b22	b21	b20	b19	b18	b17	b16
Start-of-change line number (Lower bits)							

b15	b14	b13	b12	b11	b10	b9	b8
Number of change points				reserved	Number of end-of-change lines (Upper bits)		

b7	b6	b5	b4	b3	b2	b1	b0
Number of end-of-change lines (lower bits)							

FIG. 147

	TV system				
	525/60	625/50	HDTV-1280	HDTV-1440	HDTV-1920
Line number	2~479	2~574	2~719	2~1079	2~1079

FIG. 148

PX_CTLI

b143	b142	b141	b140	b139	b138	b137	b136
reserved					Start-of-change pixel number (Upper bits)		
b135	b134	b133	b132	b131	b130	b129	b128
Start-of-change pixel number (Lower bits)							
b127	b126	b125	b124	b123	b122	b121	b120
Contrast of new pixel 16				Color code of new pixel 16			
b119	b118	b117	b116	b115	b114	b113	b112
Contrast of new pixel 15				Color code of new pixel 15			
b111	b110	b109	b108	b107	b106	b105	b104
Contrast of new pixel 14				Color code of new pixel 14			
b103	b102	b101	b100	b99	b98	b97	b96
Contrast of new pixel 13				Color code of new pixel 13			
b95	b94	b93	b92	b91	b90	b89	b88
Contrast of new pixel 12				Color code of new pixel 12			
b87	b86	b85	b84	b83	b82	b81	b80
Contrast of new pixel 11				Color code of new pixel 11			
b79	b78	b77	b76	b75	b74	b73	b72
Contrast of new pixel 10				Color code of new pixel 10			
b71	b70	b69	b68	b67	b66	b65	b64
Contrast of new pixel 9				Color code of new pixel 9			
b63	b62	b61	b60	b59	b58	b57	b56
Contrast of new pixel 8				Color code of new pixel 8			
b55	b54	b53	b52	b51	b50	b49	b48
Contrast of new pixel 7				Color code of new pixel 7			
b47	b46	b45	b44	b43	b42	b41	b40
Contrast of new pixel 6				Color code of new pixel 6			
b39	b38	b37	b36	b35	b34	b33	b32
Contrast of new pixel 5				Color code of new pixel 5			
b31	b30	b29	b28	b27	b26	b25	b24
Contrast of new pixel 4				Color code of new pixel 4			
b23	b22	b21	b20	b19	b18	b17	b16
Contrast of new pixel 3				Color code of new pixel 3			
b15	b14	b13	b12	b11	b10	b9	b8
Contrast of new pixel 2				Color code of new pixel 2			
b7	b6	b5	b4	b3	b2	b1	b0
Contrast of new pixel 1				Color code of new pixel 1			

FIG. 149

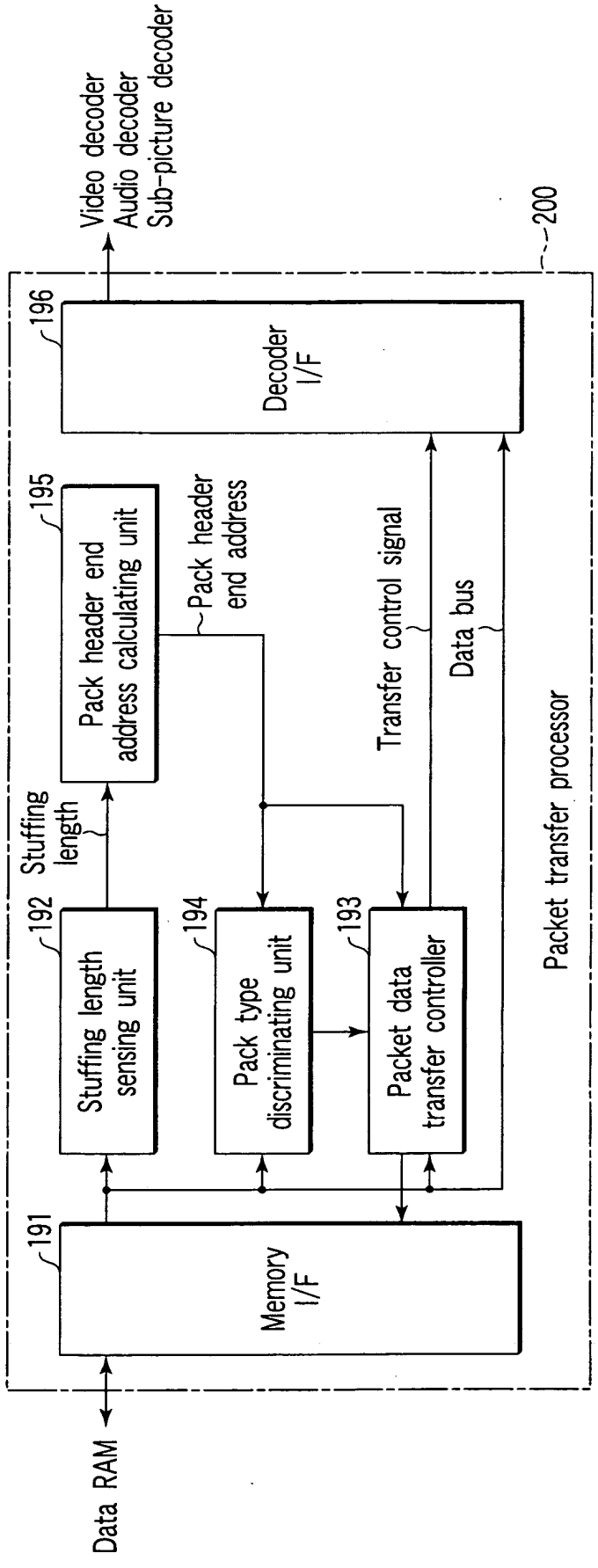

Video decoder
Audio decoder
Sub-picture decoder
200
196
Decoder I/F
195
Pack header end address calculating unit
Pack header end address
Transfer control signal
Data bus
Stuffing length
192
Stuffing length sensing unit
194
Pack type discriminating unit
193
Packet data transfer controller
191
Memory I/F
Packet transfer processor
Data RAM

FIG. 150

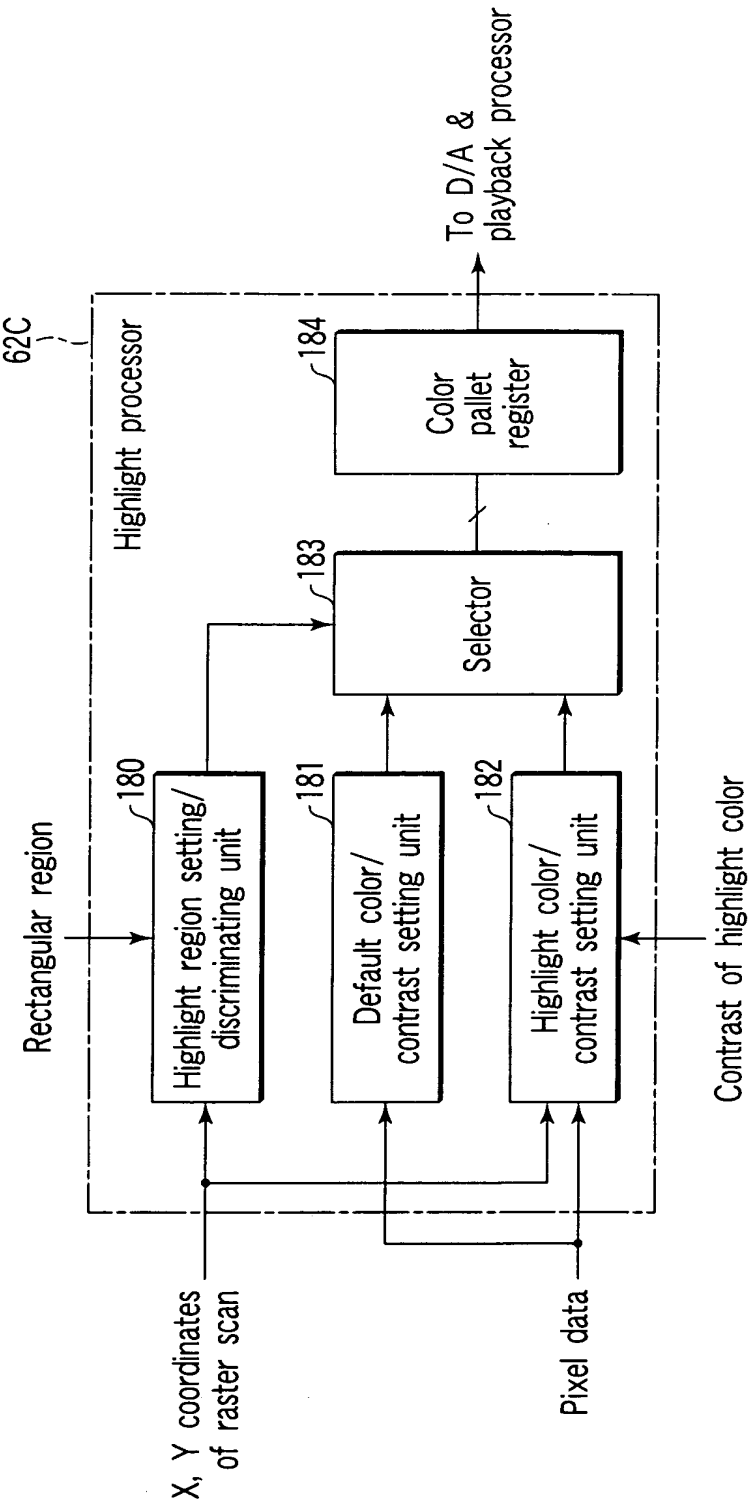

62C
Highlight processor
To D/A & playback processor
184
Color pallet register
183
Selector
180
Highlight region setting/ discriminating unit
181
Default color/ contrast setting unit
182
Highlight color/ contrast setting unit
Rectangular region
Contrast of highlight color
X, Y coordinates of raster scan
Pixel data

FIG. 151

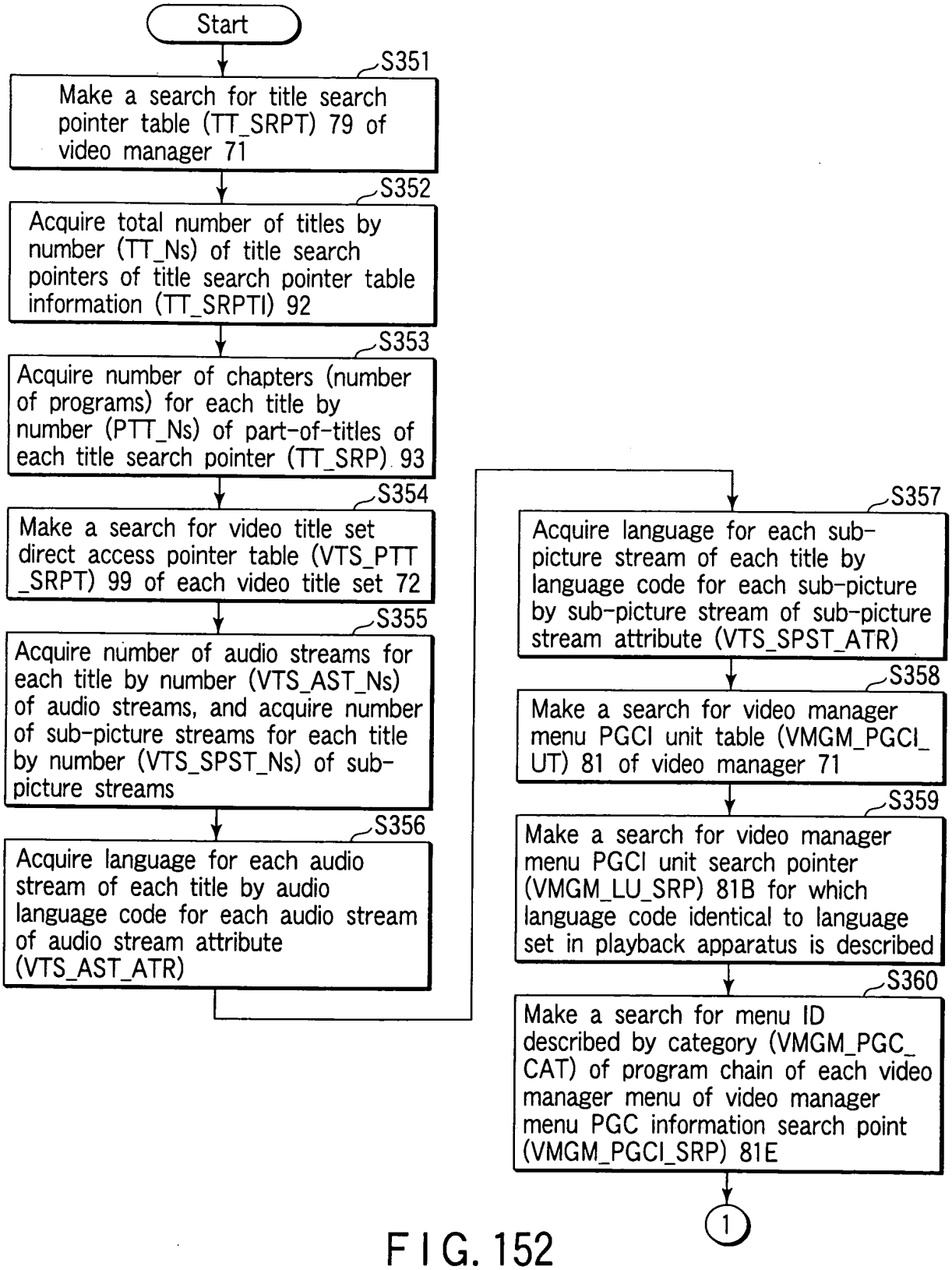

Start
S351
Make a search for title search pointer table (TT_SRPT) 79 of video manager 71
S352
Acquire total number of titles by number (TT_Ns) of title search pointers of title search pointer table information (TT_SRPTI) 92
S353
Acquire number of chapters (number of programs) for each title by number (PTT_Ns) of part-of-titles of each title search pointer (TT_SRP) 93
S354
Make a search for video title set direct access pointer table (VTS_PTT_SRPT) 99 of each video title set 72
S355
Acquire number of audio streams for each title by number (VTS_AST_Ns) of audio streams, and acquire number of sub-picture streams for each title by number (VTS_SPST_Ns) of sub-picture streams
S356
Acquire language for each audio stream of each title by audio language code for each audio stream of audio stream attribute (VTS_AST_ATR)
S357
Acquire language for each sub-picture stream of each title by language code for each sub-picture by sub-picture stream of sub-picture stream attribute (VTS_SPST_ATR)
S358
Make a search for video manager menu PGCI unit table (VMGM_PGCI_UT) 81 of video manager 71
S359
Make a search for video manager menu PGCI unit search pointer (VMGM_LU_SRP) 81B for which language code identical to language set in playback apparatus is described
S360
Make a search for menu ID described by category (VMGM_PGC_CAT) of program chain of each video manager menu of video manager menu PGC information search point (VMGM_PGCI_SRP) 81E
1

FIG. 152

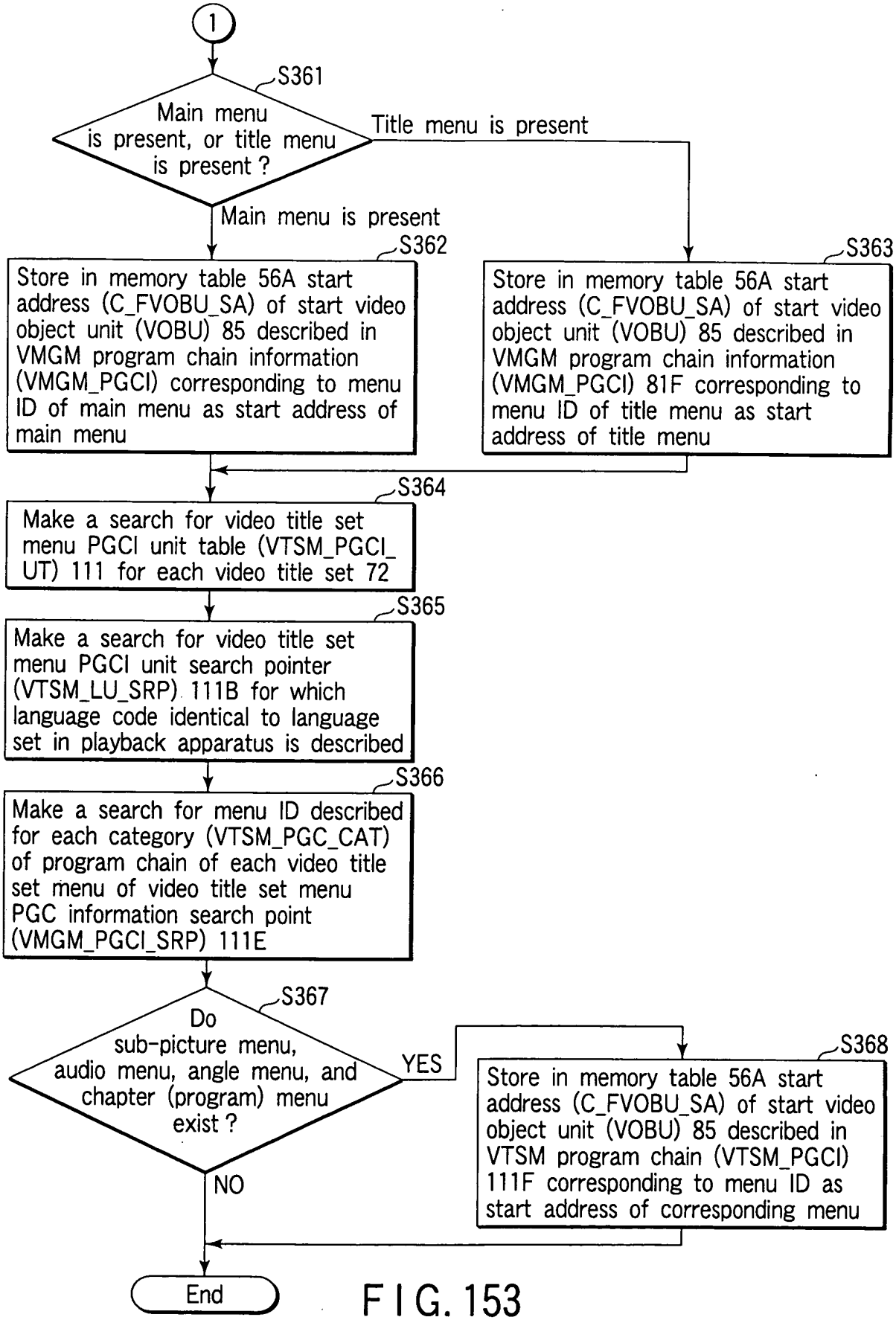

1
S361
Main menu is present, or title menu is present ?
Title menu is present
Main menu is present
S362
Store in memory table 56A start address (C_FVOBU_SA) of start video object unit (VOBU) 85 described in VMGM program chain information (VMGM_PGCI) corresponding to menu ID of main menu as start address of main menu
S363
Store in memory table 56A start address (C_FVOBU_SA) of start video object unit (VOBU) 85 described in VMGM program chain information (VMGM_PGCI) 81F corresponding to menu ID of title menu as start address of title menu
S364
Make a search for video title set menu PGCI unit table (VTSM_PGCI_UT) 111 for each video title set 72
S365
Make a search for video title set menu PGCI unit search pointer (VTSM_LU_SRP) 111B for which language code identical to language set in playback apparatus is described
S366
Make a search for menu ID described for each category (VTSM_PGC_CAT) of program chain of each video title set menu of video title set menu PGC information search point (VMGM_PGCI_SRP) 111E
S367
Do sub-picture menu, audio menu, angle menu, and chapter (program) menu exist ?
YES
NO
S368
Store in memory table 56A start address (C_FVOBU_SA) of start video object unit (VOBU) 85 described in VTSM program chain (VTSM_PGCI) 111F corresponding to menu ID as start address of corresponding menu
End

FIG. 153

Types	Start address of start video object unit
Main menu	C_FVOBU_SA of VOBU described in VMGM_PGCI
Title menu	C_FVOBU_SA of VOBU described in VMGM_PGCI
Chapter menu of Title 1	C_FVOBU_SA of VOBU described in VTSM_PGCI
Chapter menu of Title 2	C_FVOBU_SA of VOBU described in VTSM_PGCI
⋮	⋮
Audio menu of Title 1	C_FVOBU_SA of VOBU described in VTSM_PGCI
Audio menu of Title 2	C_FVOBU_SA of VOBU described in VTSM_PGCI
⋮	⋮
Sub-picture menu of Title 1	C_FVOBU_SA of VOBU described in VTSM_PGCI
Sub-picture menu of Title 2	C_FVOBU_SA of VOBU described in VTSM_PGCI
⋮	⋮
Angle menu of Title 1	C_FVOBU_SA of VOBU described in VTSM_PGCI
Angle menu of Title 2	C_FVOBU_SA of VOBU described in VTSM_PGCI
⋮	⋮

FIG. 154

6

MAIN MENU

1 TITLE	1 of 3
2 CHAPTER	2 of 5
3 AUDIO	JAPANESE
4 SUB-PICTURE	ENGLISH
5 ANGLE	1 of 3
6 LANGUAGE	

FIG. 155

Title Information

1) from New York
2) from Paris

FIG. 156A

Chapter Information

1) Metropolitan
2) Manhattan
3) 5th Street

FIG. 156B

Audio Information

1) English
2) French
3) Japanese

FIG. 156C

Subtitle Information

1) English
2) French

FIG. 156D

Angle Information

1) Left
2) Right
3) Center

FIG. 156E

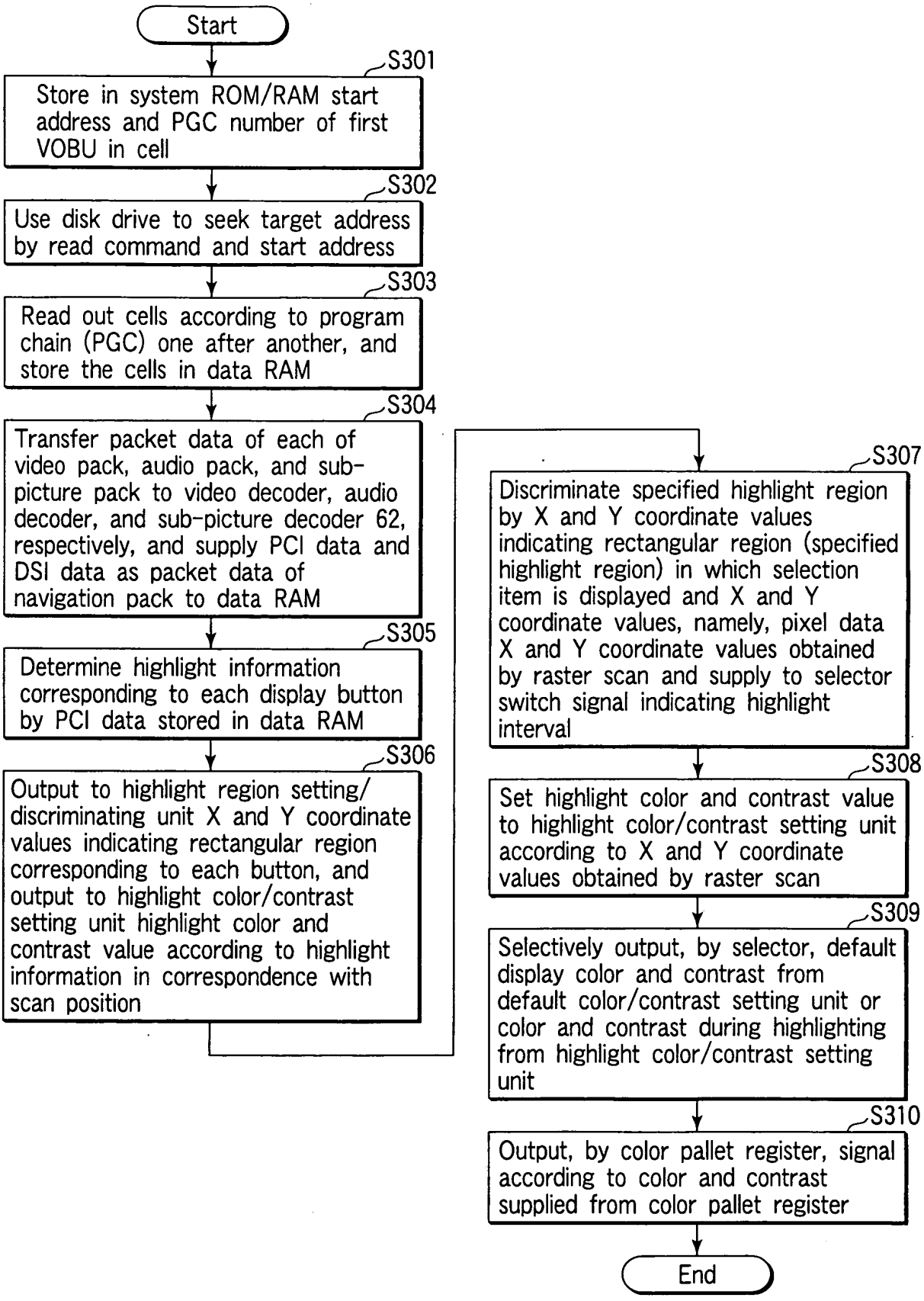
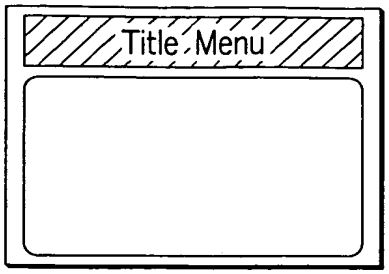
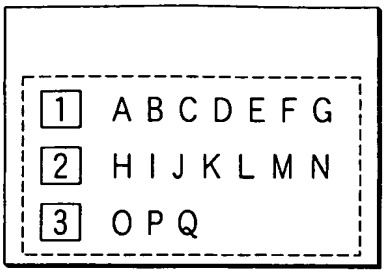

Start
S301
Store in system ROM/RAM start address and PGC number of first VOBU in cell
S302
Use disk drive to seek target address by read command and start address
S303
Read out cells according to program chain (PGC) one after another, and store the cells in data RAM
S304
Transfer packet data of each of video pack, audio pack, and sub-picture pack to video decoder, audio decoder, and sub-picture decoder 62, respectively, and supply PCI data and DSI data as packet data of navigation pack to data RAM
S305
Determine highlight information corresponding to each display button by PCI data stored in data RAM
S306
Output to highlight region setting/discriminating unit X and Y coordinate values indicating rectangular region corresponding to each button, and output to highlight color/contrast setting unit highlight color and contrast value according to highlight information in correspondence with scan position
S307
Discriminate specified highlight region by X and Y coordinate values indicating rectangular region (specified highlight region) in which selection item is displayed and X and Y coordinate values, namely, pixel data X and Y coordinate values obtained by raster scan and supply to selector switch signal indicating highlight interval
S308
Set highlight color and contrast value to highlight color/contrast setting unit according to X and Y coordinate values obtained by raster scan
S309
Selectively output, by selector, default display color and contrast from default color/contrast setting unit or color and contrast during highlighting from highlight color/contrast setting unit
S310
Output, by color pallet register, signal according to color and contrast supplied from color pallet register
End

FIG. 157



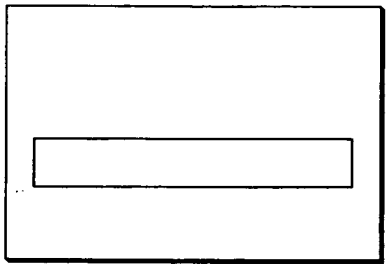
Video

FIG. 158A



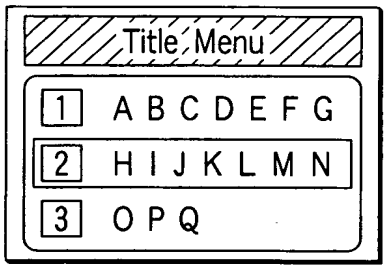
Sub-picture

FIG. 158B



Highlight information

FIG. 158C



Mixed picture

FIG. 158D

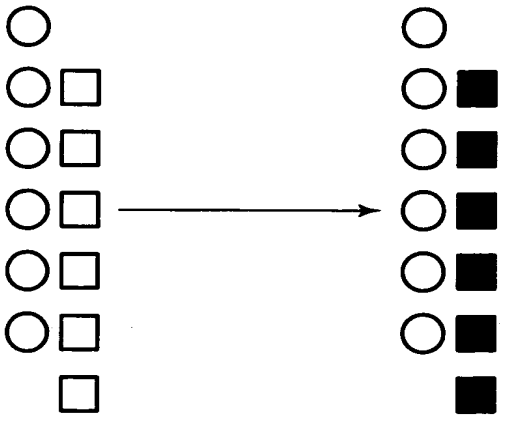


FIG. 160A

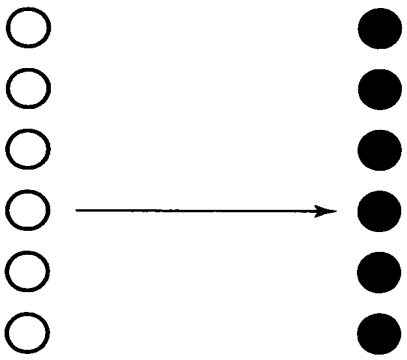
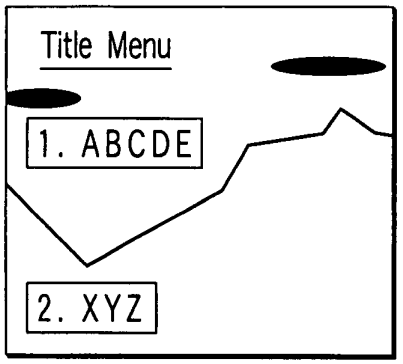
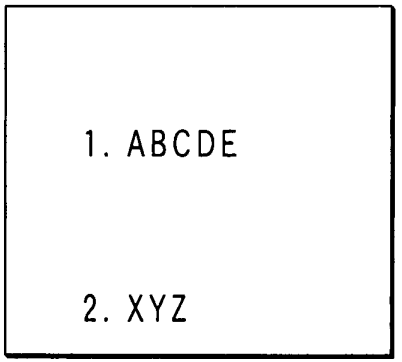


FIG. 160B



Video

FIG. 159A



Sub-picture

FIG. 159B

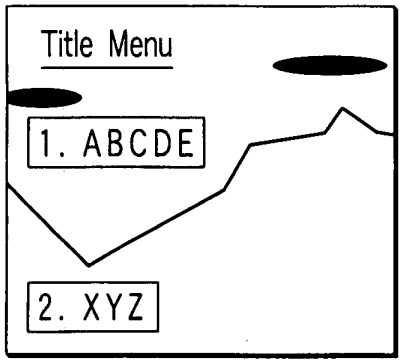


FIG. 159C

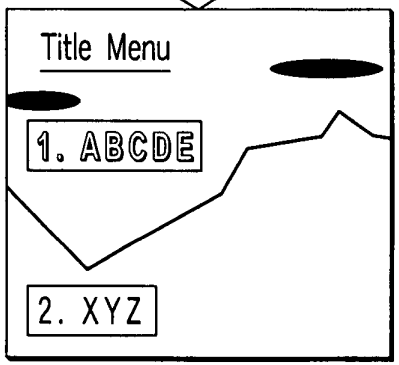


FIG. 159D

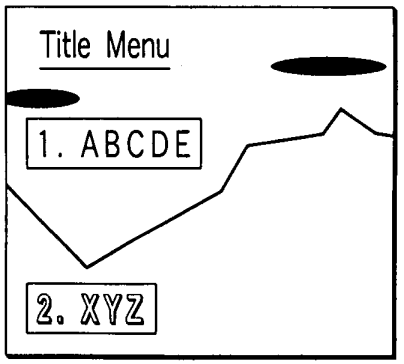


FIG. 159E

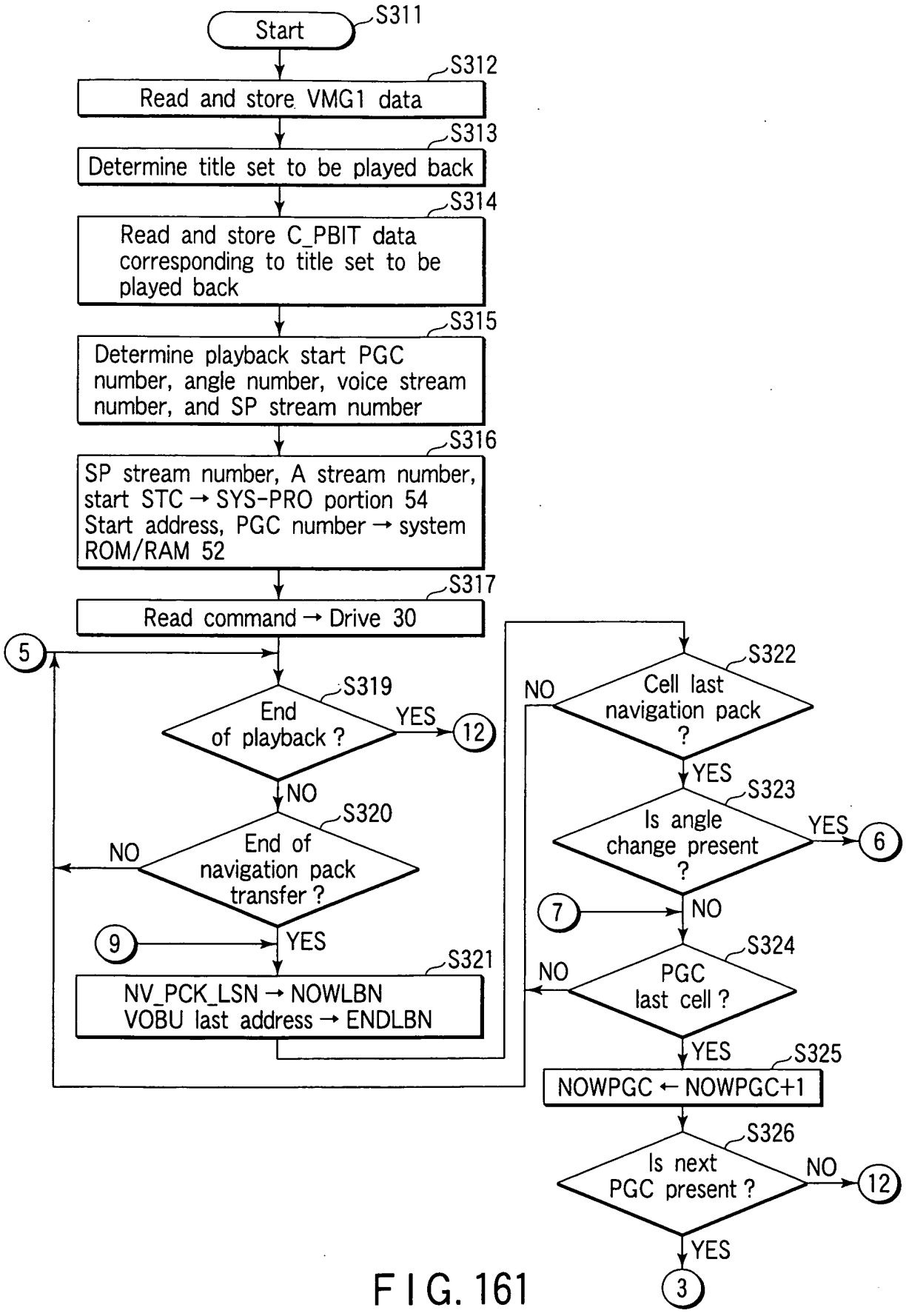

Start
S311
S312
Read and store VMG1 data
S313
Determine title set to be played back
S314
Read and store C_PBIT data corresponding to title set to be played back
S315
Determine playback start PGC number, angle number, voice stream number, and SP stream number
S316
SP stream number, A stream number, start STC → SYS-PRO portion 54
Start address, PGC number → system ROM/RAM 52
S317
Read command → Drive 30
5
S319
End of playback ?
YES
12
NO
S320
End of navigation pack transfer ?
NO
9
YES
S321
NV_PCK_LSN → NOWLBN
VOBU last address → ENDLBN
S322
Cell last navigation pack ?
NO
YES
S323
Is angle change present ?
YES
6
7
NO
S324
PGC last cell ?
NO
YES
S325
NOWPGC ← NOWPGC+1
S326
Is next PGC present ?
NO
12
YES
3

FIG. 161

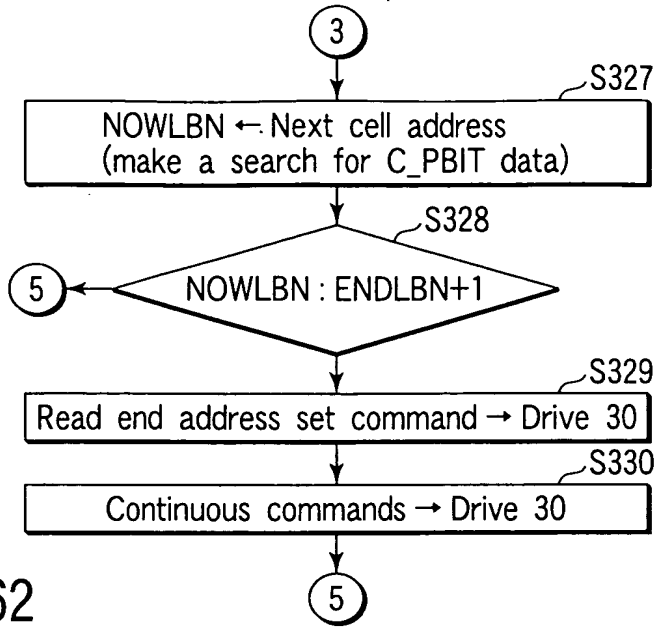


FIG. 162

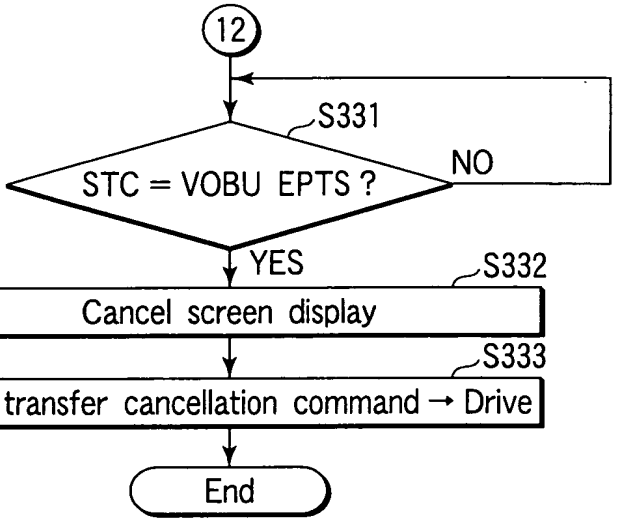


FIG. 163

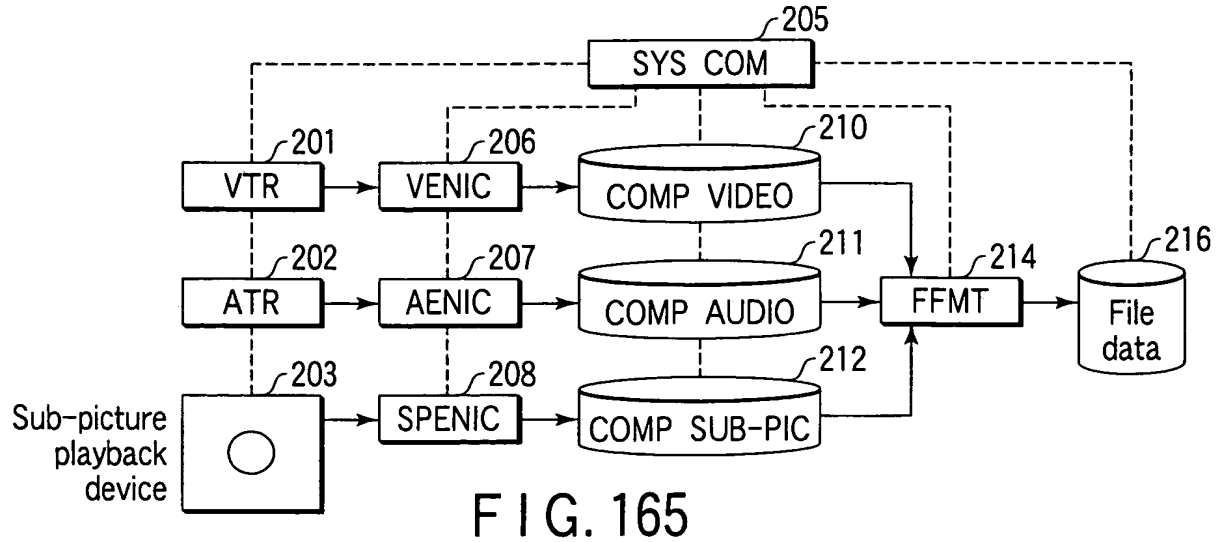


FIG. 165

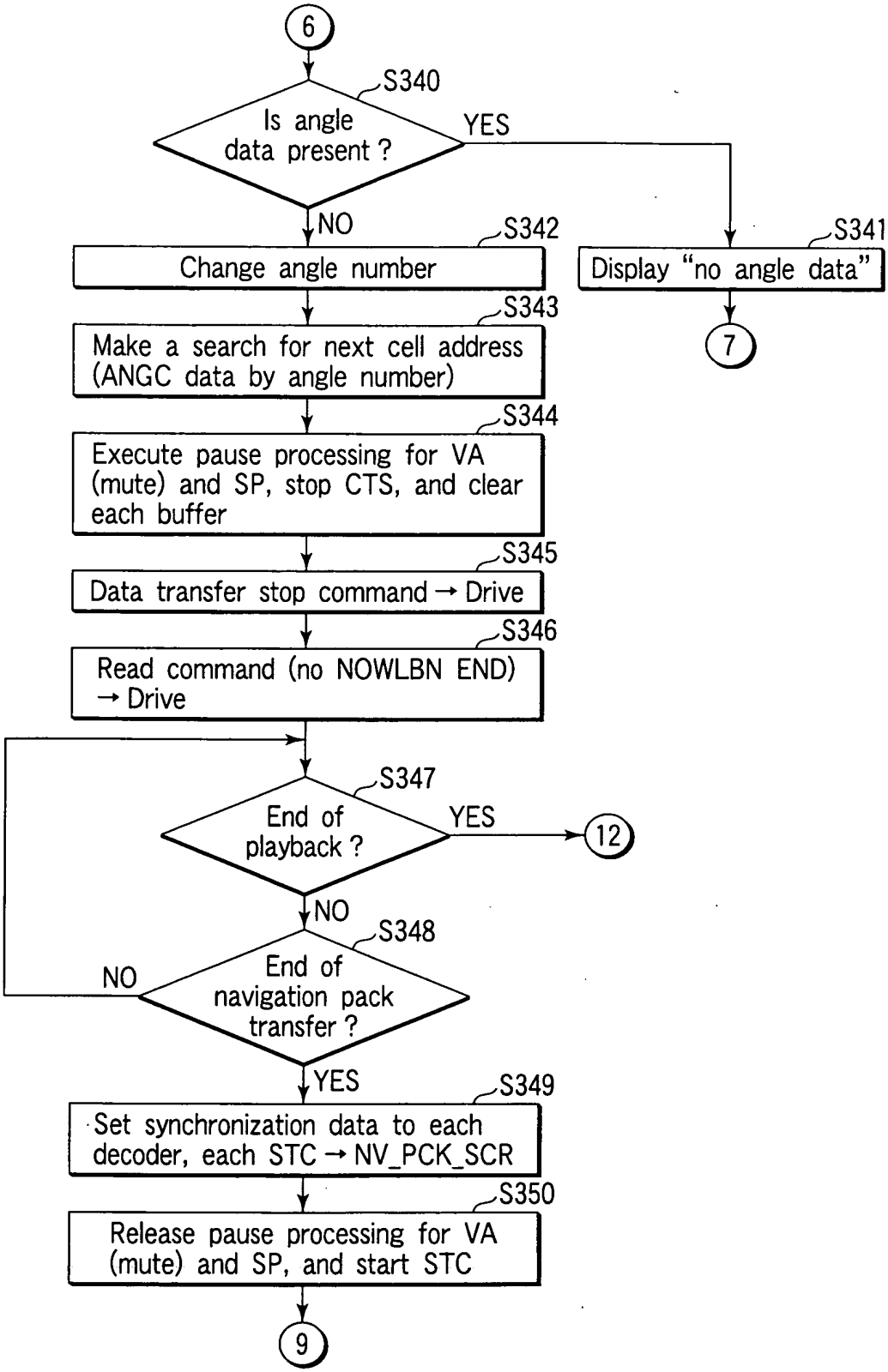

6
S340
Is angle data present ?
YES
NO
S342
Change angle number
S341
Display "no angle data"
7
S343
Make a search for next cell address (ANGC data by angle number)
S344
Execute pause processing for VA (mute) and SP, stop CTS, and clear each buffer
S345
Data transfer stop command → Drive
S346
Read command (no NOWLBN END) → Drive
S347
End of playback ?
YES
12
NO
S348
End of navigation pack transfer ?
NO
YES
S349
Set synchronization data to each decoder, each STC → NV_PCK_SCR
S350
Release pause processing for VA (mute) and SP, and start STC
9

FIG. 164

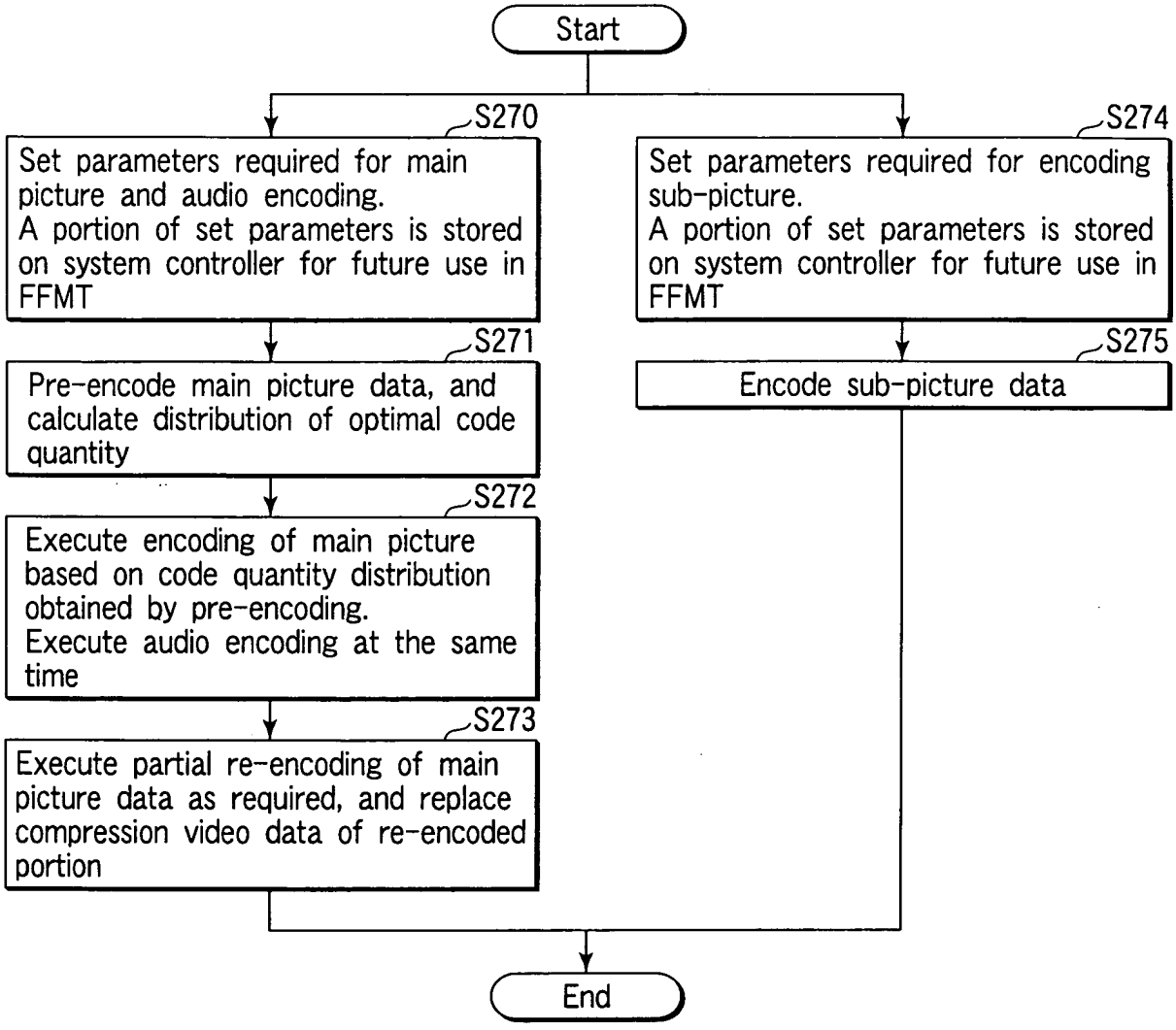

Start
S270
Set parameters required for main picture and audio encoding.
A portion of set parameters is stored on system controller for future use in FFMT
S271
Pre-encode main picture data, and calculate distribution of optimal code quantity
S272
Execute encoding of main picture based on code quantity distribution obtained by pre-encoding.
Execute audio encoding at the same time
S273
Execute partial re-encoding of main picture data as required, and replace compression video data of re-encoded portion
S274
Set parameters required for encoding sub-picture.
A portion of set parameters is stored on system controller for future use in FFMT
S275
Encode sub-picture data
End

FIG. 166

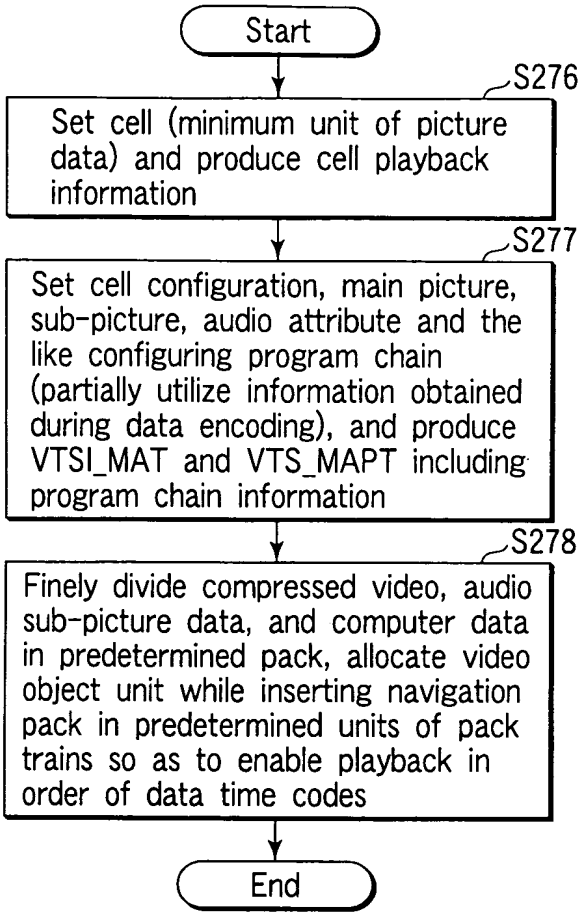


FIG. 167

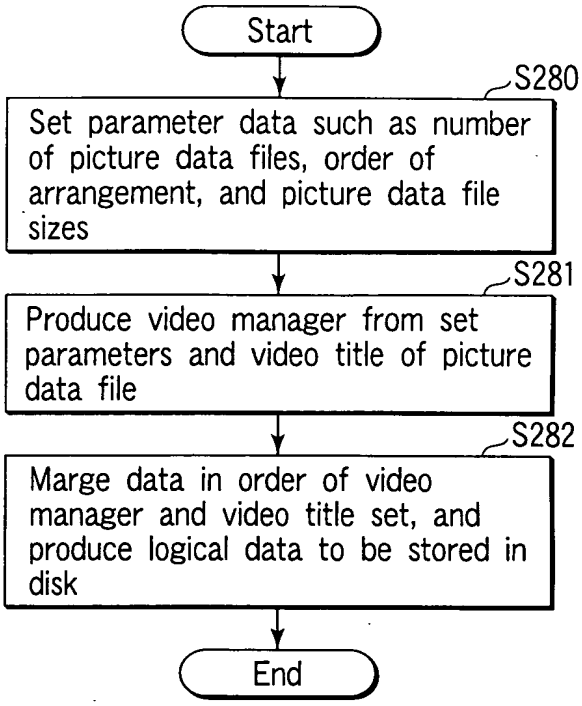


FIG. 169

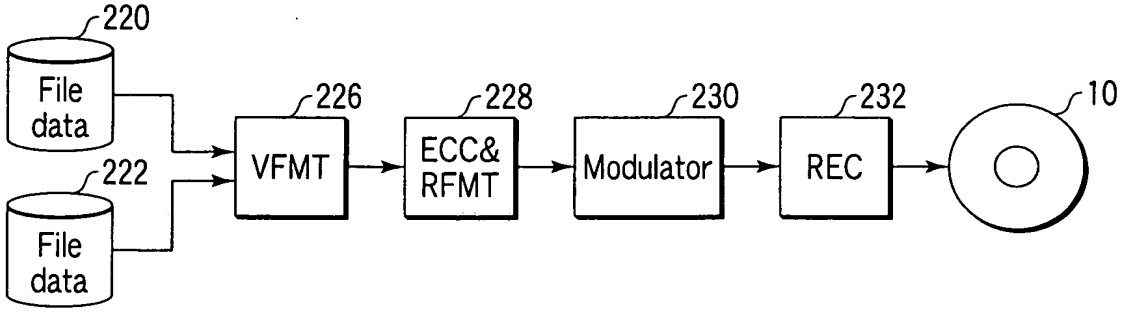


FIG. 168

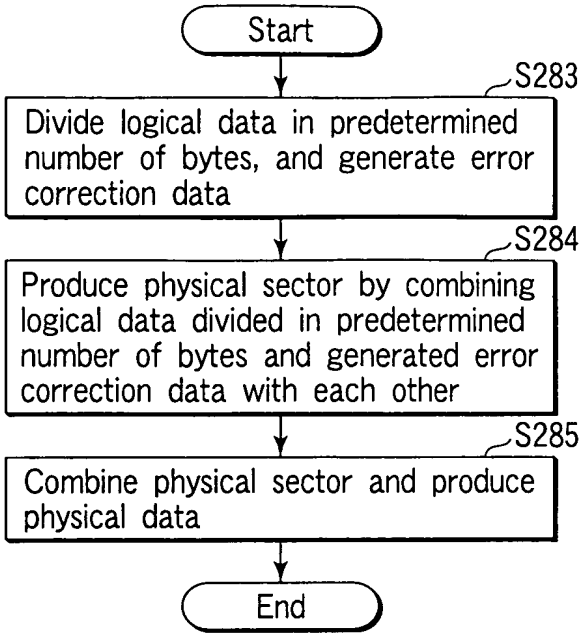


FIG. 170

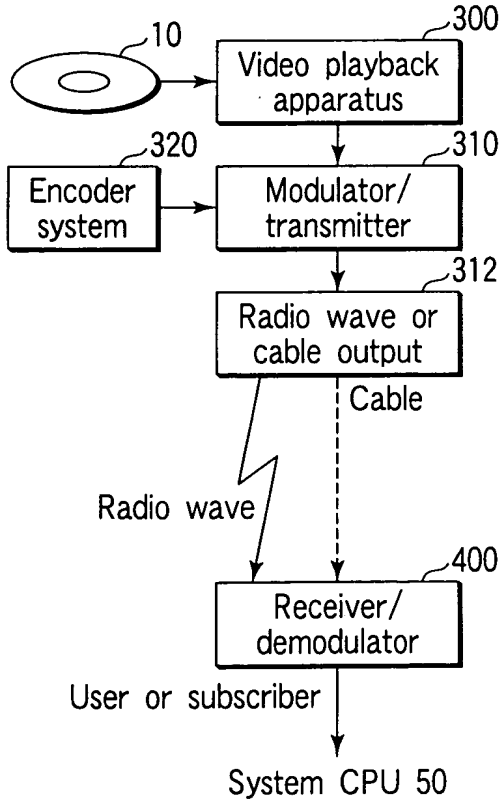


FIG. 171

Downward conversion after data mixing

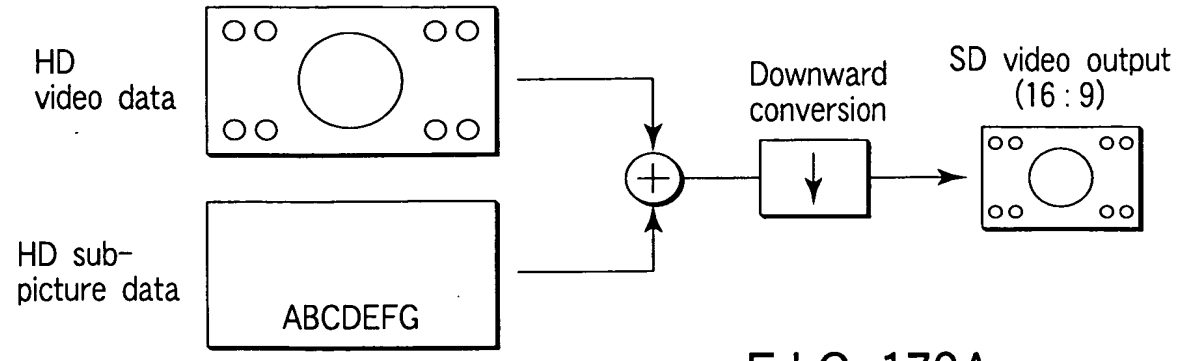


FIG. 172A

Downward conversion before data mixing

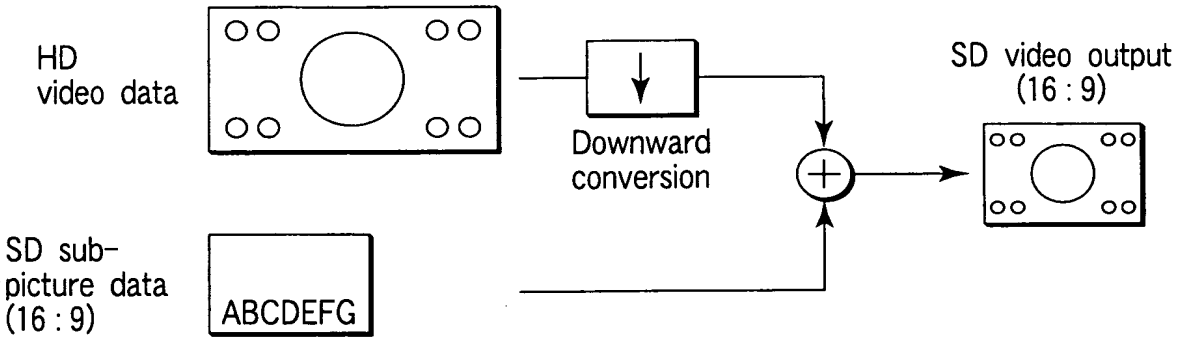


FIG. 172B

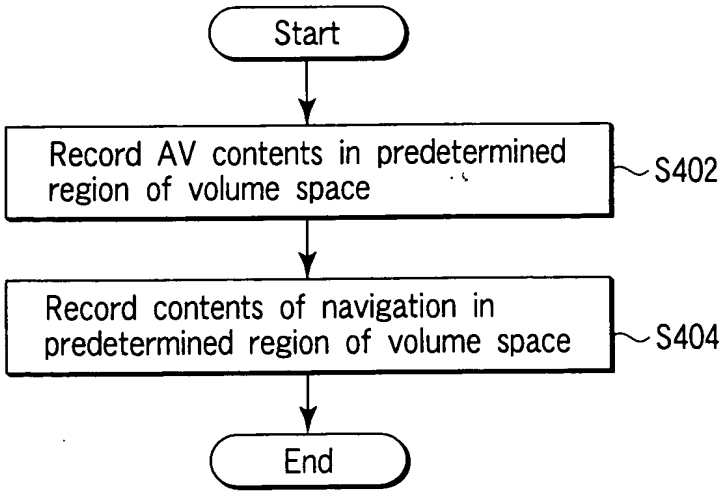


FIG. 173